Gas Journal

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Editorial Notes

The Coal Settlement

LAST Friday, when in the midst of the grief which the nation was suffering any other outcome was almost unthinkable, a peaceful settlement by compromise was announced of the prolonged dispute in the coal industry. The compromise was reached by certain sacrifices on both sides. The miners had opened their campaign with a demand for a flat-rate increase, in all districts alike, of two shillings a shift for adult workers. Early on in the negotiations it was quite clear that, under present organization, the industry had nothing like this to offer them. It did, however, offer them the deferred prospect of increased wages which might accrue from centralized selling and the elimination of wasteful competition. It was soon found that the miners were not prepared to wait, and the public sympathy which had been, from the very first, on the side of their claim for better conditions took material shape, and consumers of all kinds, including, of course, our own Industry, undertook to pay more for their coal, on condition that the increase was devoted entirely to the men's wages, and that no stoppage took place.

Any division of the funds thus available to give a flat level increase in all districts, with their basically differing circumstances, was beyond the range of practical politics, and the extremely wise contribution of the miners to a peaceful settlement was to waive their demand for an all-round flat rate increase, and to accept what the public offered when the industry itself had nothing immediate to give. This, as is well known, amounts to increases between 5d. and 1s. a shift according to district.

The coal using industries and public, therefore, have provided the wherewithal to pay increased wages, and the miners have yielded such part of their claim as in form and amount was clearly untenable. The owners' contribution has, perhaps, entailed a greater sacrifice of principle than of anything else. Their objection to the men's demand for national negotiations on all questions affecting the industry received scant sympathy from the public, but those who have better knowledge, and perhaps better memories, of the difficulties of dealings between the owners and the Miners' Federation up to the 1926 disaster can realize that the former's present concession of at any rate the principle has entailed a very real sacrifice. The fact remains that "never again," which was almost a religion with many of them, has given way to the offer of a Joint Standing Consultative Committee to discuss all matters of common interest, not excluding the general principles of determining wages in the districts.

So on this basis a truce has been called, and if we have confined ourselves to a record of facts and abstained from comment, it is because in our view the coal industry should be given a chance to show whether it can get itself out of the wood. In the time of national sorrowing during which the settlement was announced, the removal of the threat of coal trouble has naturally hardly made the impression it would otherwise have done. Moreover, the real significance has been widely missed of the fact that the settlement was reached by agreement and compromise, after a reasonably argued discussion, lacking the extreme bitterness which characterized so many of the disputes up to 1926. Once again the industry has an opportunity of working out its own salvation—perhaps in a better spirit and with a more hopeful outlook than ever before. The public, especially after their generous contribution in the present instance, have a right to demand that strenuous efforts be made by the industry to put itself upon a sound basis in every way. With the proviso that matters be not allowed to drift as they have so often done in the past, let us give the parties who really understand the difficulties every chance to make good.

Rating

THE House of Lords gave judgment on Friday last in the appeal of certain Rating Authorities against the decision of the Court of Railway and Canal Commission reducing the assessment of the Southern Railway from some £1,840,000 to £1,077,131. The principal point which was argued, and which naturally affects all the other Railway Companies, was whether the system of assessment on the basis of profits has been modified by the Railway (Valuation for Rating) Act, 1930.

Into the intricate details of the argument it is not for us to go beyond remarking that the decision of the House of Lords in favour of the Railway Company establishes the profits basis of rating and is therefore of interest to Public Utilities other than Railways whose assessments depend upon that system. In particular it is a refutation of the argument popular in some quarters that the profits principle can be abandoned if its application would give results not to their taste; it also establishes the orthodox method, including the computation of tenants' capital by which the assessment from the profits should be ascertained. The effect of the Judgment in favour of the Railway Companies will date back to April, 1931, and will mean a saving of some £300,000 per annum in rates to the Railway Company—a total of £1,500,000 for the quinquennial period.

The Judgment gives rise to many interesting specula-

lations. In the first place, will any attempt be made to reverse the decision by legislation? Such a loss in revenue can hardly be regarded by Rating Authorities with equanimity. If legislation is introduced there is no doubt that the interests of Public Utilities will be carefully safeguarded by the Conjoint Conference of Public Utility Associations. It is also to be remembered that Railway Companies were de-rated only on condition that the benefits of de-rating were passed on to certain specified traffics including certain coal consignments.

The Railway Companies have already announced that no question arises of a refund by the traders of the rebates they have received out of the Freight Rebates Fund—but what of the future? Most important of all is the use to which the Railway Companies will put the surplus funds which the judgment has somewhat unexpectedly placed in their hands. It is to be remembered that the general level of freights is still 60% above pre-war level and that the wages of Railway workers compare most favourably with those paid in many other industries. Further, the Railway Companies have expressed their inability to follow the lead of the Gas Industry in giving a voluntary increase on the prices fixed by the coal contracts.

Should not the opportunity be taken to grant some substantial concessions in freight rates, especially those applying at present to heavy goods, particularly the life blood of our industries—coal? If such a policy were adopted it would in our view materially assist in restoring prosperity to our country and thereby benefit the Railway Companies themselves.

Selling at Widnes

In this issue we publish at statement, for which we are indebted to Mr. C. E. Dickinson, of Widnes, setting out details of the annual sales of gas appliances from the time when the Gas Department opened showrooms—December, 1926—to the end of last year. Analysis of the figures given proves most interesting in showing the actual results accruing from enterprising sales policy. Over the nine-year period the cash value of the sales has amounted to £65,460—which, it will be agreed, is very good going, when it is remembered that at March last the number of consumers on the Department's books was 11,270. During the period 4,332 cookers, 2,568 fires, 1,357 wash-boilers, 844 water-heaters, and 303 radiators have been installed either for cash or on hire purchase.

Let us examine the figures from the aspect of sales policy. In 1929 it was decided to sell water-heaters and radiators on the hire-purchase system, for either three or five years' period. The effect was felt at once, and since the scheme was put into operation the water-heating load has greatly developed and the sales curves is a rising one, Then in 1931 hire-purchase of gas fires was extended to a five-year period, repayments to include cost of fixing. Here again the figures in Mr. Dickinson's schedule speak for themselves. In the same year it was decided to supply wash-boilers and radiators on the "fixed-free" basis, with extended period of repayment, while irons were offered on hire-purchase terms. Since then sales have averaged over a hundred a year. To our mind, however, the most interesting set of figures relate to the year 1933, when a distribution workers' commission scheme was commenced. On several occasions we have emphasized how interdependent are indoor and outside salesmen and the men who carry out the installation work. The fitter meets the consumer on her own ground, and many opportunities constantly present themselves for linking up the work of the salesman proper. Fitters should be encouraged to keep their weather-eye open to every sales possibility, and the closest liaison should be established and preserved between fitter and salesman. This implies at least two things. First, the fitter must be aware of his undertaking's sales policy; difficulties should be mutually appreciated and understood between fitter and salesman. Secondly, practical incentive to sales effort must be provided. Though there are arguments against the policy of paying to fitters commission on sales effected through their original information, we feel that, properly organized, the plan is a very sound one. The first year's sales after the opening of the Widnes showrooms totalled £3,550. In 1933 the total was £15,315—approximately £1 7s. per consumer—and of this amount more than one-third ranked for payment of commission to distribution workers.

In October, 1932, the Widnes Gas Department decided to make no charge to prepayment consumers for additional lighting points, provided they purchased a burner, mantle, and globe of modern design, and in 1934 it was decided that payment for the burner, &c., could be made by a lower setting of the prepayment meter. This scheme has been extremely successful. Since its adoption the Department has installed 498 gas lighting points in place of electricity, and continues to effect conversions, for many householders, with their houses wired under the assisted wiring scheme, are finding the joint charge for electricity and wiring more than they can pay. And, in addition to these conversions, the number of pendants and brackets fixed to replace old patterns, and including new positions, amounts to 1,193, making a total of 1,691. If we assume that, on an average, gas lighting accounts for a yearly consumption per house of 10,000 cu.ft., it will be seen that the load obtained as a result of conversion from electricity to gas amounts to 5,000,000 cu.ft. per annum, while the load covered since the commencement of the scheme on Oct. 12, 1932, is a matter of 17,000,000 cu.ft. a year. Moreover, the gas lighting installations are modern—which means a very great deal. Mr. Dickinson's record since the opening of the showrooms nine years ago is one of which he may well be proud, and it is the result of pursuing an enterprising sales policy.

Heat Service

The selling of gas and coke for heating should be regarded as the selling, not of products and appliances, but of heat service. Success will depend on this method of approach, and one of the happiest auguries is the co-operation which is being fostered betwen the Gas Industry and heating engineers. An example of what we mean by this co-operation is provided by this month's meeting of the Institution of Heating and Ventilating Engineers, when the members received a Paper by Dr. F. M. H. Taylor, of the Gas Light and Coke Company, explaining in considerable detail the many recent developments which have been made by our Industry in perfecting this heat service. The whole problem has been and continues to be investigated in a very broad way; and it is a big problem involving the many aspects of comfort, economy, and saving of labour. Chief among the technical developments which have enormously widened the scope for both gas and coke is automatic control, which was the theme of Dr. Taylor's Paper. Exacting modern heating requirements can be met with nicety by gas and coke, and in making known to the heating engineering profession what our Industry has to offer, and in extending to them a helping hand, Dr. Taylor has performed a most useful task. An extract from his Paper is published in to-day's "Journal."

Advances in America

"DURING the year 1935 the Gas Industry in the United States continued the improvement which began in the previous year. Not only did the Industry gain in revenue and sales, but it continued with unabated vigour the broad research programme carried on in many directions to develop new and improved uses for gas fuel. In addition the past year brought into bold relief the new spirit which has surcharged the Industry in every section of the country. The spirit which is so much in evidence to-day is one of united, co-operative, and aggressive effort to promote the sale of gas and gas appliances in the most modern and effective way." The foregoing is quoted from the current issue of the *American Gas Association Monthly*, and is a summing-up of the statistical review compiled by the Association's statistical department. Many statements in this review are of interest and significance. For example, in face of solid electrical opposition, approximately 1,100,000 gas cookers were sold during the year—an increase of nearly 30% and more than the total number of electric cookers in use in the United States at the present time. A significant fact is that nearly 75% of the cooker sales were of models incorporating modern automatic features and relatively of high price. Another striking advance was registered in the field of gas refrigeration, 1935 showing a gain of 56% in the sales of gas refrigerators over 1934. It is interesting to note that the amount of money spent on advertising is increasing and that the advertisement copy is more forceful. "The statements on behalf of gas fuel," we learn, "are no longer as modest as they once were; they are forthright strong declarations of the superiority of gas."

The American Gas Industry is, of course, a composite of manufactured gas and natural gas undertakings, and in point of fact the "manufactured" side is of less magnitude than the British Gas Industry. Never before have there been more consumers connected to gas mains in America, yet the number served with manufactured gas is considerably lower, at 9,973,000, than in our own country. And though the revenue of the entire Industry showed a gain, that of the manufactured gas companies fell, in spite of the greater number of consumers. Sales too, for domestic purposes other than house heating, declined by 3% for the year. The American Gas Industry has a very clear way of presenting its returns, a way which we should do well to follow. The industrial and commercial load is shown distinctly separate from the domestic load, which we consider highly desirable. As a minor point, "house heating" is also separately shown, though we are not so much concerned with the significance of this. But by dividing the domestic sales from the industrial, the trend of usage is sharply indicated; and since 1930 there has been a steady decline in "domestic" sales of manufactured gas in the United States, while at the same time enormous numbers of appliances have been installed. Total sales of manufactured gas showed an increase in 1935 over 1934, but the increase is wholly accounted for by industrial and "house heating," and the decline in the consumption per consumer figure is just as disquieting in the United States as it is in Great Britain.

A National Campaign

WE suggest that the solution to this problem lies in the development of the water heating load by gas, with the aid of promotional tariffs; and in this connection we are particularly interested in the latest "national drive" of the American Gas Industry—an eight months' contest, commencing next Saturday and continuing till Sept. 30. This "clean-up" drive aims to sell 300,000 new automatic gas water heaters, and its organization certainly shows a very desirable measure of co-operation. We have received full details of the scheme, the first national contest run, which is sponsored by the Association of Gas Appliance and Equipment Manufacturers and the Water Heating Committee of the American Gas Association. Twenty water heater manufacturers have underwritten the expense of the campaign, which amounts to $100,000; and a feature of the scheme is the enlistment of the help of plumber dealers. The scheme is being launched by most effective literature and a "Clean-Up" Drive portfolio has been prepared containing a "great mass of promotional material"—a "combination of complete sales helps that will back up the contest, inspire the salesmen, enthuse the plumber-dealer, push up the quota." Many substantial prizes are offered, and Gold Honour Medals and Silver Honour Plaques are thrown into the kitty. This type of go-getter campaign may not appeal to some on this side of the Atlantic, and all the medals, and so on, may appear a trifle childish. On the other hand, what attracts us is the co-operative strength which characterizes the scheme and the very careful planning of the campaign. The steps taken not only to stimulate but to maintain the keen interest of the salesman throughout the eight-month period are admirable; and we hope that as a result of the national drive the consumption per consumer figure in the States will have a happier complexion.

Australian Statistics

FROM American statistics let us turn to those relating to the Gas Industry of Australia, as compiled by the Australian Gas Light Company. The data refer to 73 undertakings and reflect substantially the entire Industry's progress in 1934. The quantity of gas manufactured by these undertakings was 17,754 million cu.ft.—an increase of practically 2% over the previous year, which itself showed an increase over 1932. The amount of carburetted water gas made represented 13% of the total gas, dropping from 16% in 1933. It is disappointing that the efforts made in 1930 to obtain a classification of industrial and domestic loads have proved unsuccessful. The fact remains, however, that in 1934 there was an increase in the consumption per consumer—not a great deal, admittedly, but it is something which other countries cannot boast about. The average figure, however, at 20,886 cu.ft. compares unfavourably with 1930, which recorded 22,995 cu.ft., though since that time there has been an increase of 20,000 in the number of consumers. The number of consumers at the end of 1934 is the greatest recorded since information on the subject has been available.

Forthcoming Engagements

Jan.

30.—B.C.G.A.—Eastern District Meeting at Cambridge.

31.—I.G.E.—Liquor Effluents and Ammonia Committee, 11.15 a.m.; Joint Research Committee, 2.30 p.m.

31.—B.C.G.A.—South-Western District Meeting at Exeter.

Feb.

4.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—Meeting 2.30 p.m.

6.—MIDLAND JUNIOR ASSOCIATION.—Meeting. Paper by Mr. G. C. Pearson.

8.—MANCHESTER AND DISTRICT JUNIOR ASSOCIATION.—Meeting at Darwen. Paper by Mr. J. A. Derbyshire.

8.—SCOTTISH WESTERN JUNIOR ASSOCIATION.—Meeting.

11.—BRITISH GAS FEDERATION.—Meeting of Exhibitions Committee, 28, Grosvenor Gardens, S.W. 1, 12 noon.

The Gas Industry Offers its Condolences to the Royal Family on the Death of the Sovereign

Messages of Sympathy from our National Bodies.

The following telegrams of condolence in the Nation's great bereavement have been sent to H.M. the King's Private Secretary by the Gas Industry's National Bodies.

From the British Gas Federation—

The Members of the British Gas Federation desire to convey to His Majesty and to the Royal Family their sincere and loyal sympathy at this time of national mourning.

DAVID MILNE-WATSON,
Chairman of the Council.

From The Institution of Gas Engineers—

The Council and Members of The Institution of Gas Engineers humbly desire to express their deep sorrow upon the death of His Majesty King George and dutifully to offer to your Majesty an assurance of Loyalty and Devotion on your Accession to the Throne.

WILLIAM MONCRIEFF CARR,
President.

JOHN RUSSELL WILLIS ALEXANDER,
Secretary.

From the National Gas Council—

The Members of the National Gas Council of Great Britain and Ireland desire to express to His Majesty the King and to the Members of the Royal Family loyalty and sympathy in their bereavement.

DAVID MILNE-WATSON,
President.

From the Society of British Gas Industries—

The Members of the Society of British Gas Industries humbly beg to convey to His Majesty and to the Members of the Royal Family their heartfelt and loyal sympathy.

D. M. HENSHAW,
Chairman of the Council.

From the British Commercial Gas Association—

On behalf of President, Vice-Presidents, and all Members of British Commercial Gas Association, and of Lady Goodenough and myself, I beg to submit loyal and deepest sympathy to His Majesty. God save the King.

FRANCIS GOODENOUGH,
Executive Chairman.

From the National Joint Industrial Council for the Gas Industry—

The Employers and the Workers represented on the National Joint Industrial Council for the Gas Industry respectfully desire to offer to His Majesty and to the Members of the Royal Family their sincere condolences in their bereavement.

DAVID MILNE-WATSON,
Chairman.

CHARLES DUKES,
Vice-Chairman.

From The Institution of Gas Engineers to Her Most Gracious Majesty Queen Mary—

The Council and Members of The Institution of Gas Engineers respectively offer to your Majesty and the Royal Family their profound sympathy upon the death of His Majesty King George, whose noble example of Devotion to Duty will continue to inspire all Subjects of their beloved Sovereign.

WILLIAM MONCRIEFF CARR,
President.

JOHN RUSSELL WILLIS ALEXANDER,
Secretary.

Replies to telegrams of condolence have been received as follows:

To the British Gas Federation of the National Gas Council—

The King is touched by your kind message of sympathy and will be glad if you will express his sincere thanks to all who joined in it.—PRIVATE SECRETARY.

To The Institution of Gas Engineers—

Please express to the Council and Members of The Institution of Gas Engineers the King's sincere thanks for kind message of sympathy and for loyal assurances accompanying it.—PRIVATE SECRETARY.

To Sir Francis Goodenough—

I sincerely thank you both for your kind message, and I much appreciate the sympathy shown me in my sorrow by the Presidents and members of the British Commercial Gas Association.—EDWARD R.I.

From Her Most Gracious Majesty Queen Mary to The Institution of Gas Engineers—

I am desired to convey to you and to the Council and Members of your Institution the Queen's sincere thanks for your kind expression of sympathy in her irreparable loss.—PRIVATE SECRETARY.

Personal

Mr. ALBERT ERNEST HAROLD WEBB, J.P., has been elected a Director of the Plymouth and Stonehouse Gas Light and Coke Company to fill the vacancy created by the death of Mr. Francis F. W. Hawker.

* * *

Mr. BASIL HEASTIE, M.Inst.C.E., M.I.Chem.E., has joined the Board of Asbestos and Engineering Products, Ltd., Winchester House, E.C. 2, who, among other activities, look after the interests in London and the South-Eastern counties of the Oxley Engineering Company, Ltd., of Leeds.

* * *

After twenty years' service on the Mossley Town Council, Alderman JOHN OGDEN, J.P., Chairman of the Gas Committee, has resigned his position owing to ill-health and his desire to take a rest from public life. The Town Council, however, is anxious that Alderman Ogden, who was Mayor of the Borough in 1922-23, should continue his connection with the Council, and a deputation has been appointed to interview him and ask him to allow his name to be submitted to the next Council meeting in February for re-election as an Alderman.

* * *

Mr. W. B. HARRISON, Assistant Engineer and Manager to the Colne Corporation Gas Department, has been appointed Engineer and Manager to the Sowerby Bridge Gas Department.

Mr. Harrison received his early education at the Blackburn Grammar School, leaving there in 1923, when, after a brief probationary period under his father (Mr. A. J. Harrison, Engineer and General Manager, Accrington District Gas and Water Board), he was articled to Messrs. Robert Dempster & Sons, Gas and Constructional Engineers, of Elland. Six-and-a-half years were spent at Messrs. Dempster's and embraced practical and theoretical training in design, manufacture, and erection of all types of gas-works plant. In June, 1929, Mr. Harrison was appointed Technical Assistant and Draughtsman to the Colne Corporation Gas Department, being appointed Assistant Engineer and Manager in June, 1932. Mr. Harrison holds the advanced certificate of the Institution of Mechanical Engineers and a first-class higher-grade certificate in Gas Engineering of The Institution of Gas Engineers.

In 1932 he was admitted to the Institution as an Associate Member and later in the same year was successful in obtaining the Institution Diploma. Mr. Harrison is 29 years old.

Obituary

Mr. WILLIAM HILL, for 31 years Engineer and Manager of the Stalybridge Corporation Gas Department, has died at his residence, Park View, 145, Mottram Road, Stalybridge, at the age of 68. He retired in 1934.

* * *

We learn from a local correspondent of the death at the age of 61 of Alderman GEORGE BILLINGTON, J.P., Chairman of the Salford Gas Committee, which was later merged in the Light, Heat, and Power Committee, for over 25 years until he resigned his position last November for health reasons.

* * *

One of the oldest members of the North British Association of Gas Managers has passed away in the person of Mr. WILLIAM S. BROWN, whose death occurred at Glasgow on Jan. 2 at the age of 91. Mr. Brown was principal proprietor of the Busby Gas Company, which introduced gas to the Giffnock district in 1892.

CORRESPONDENCE

Public Lighting Contracts

SIR,—By a bare majority of eight votes the Camberwell Borough Council on Wednesday, Jan. 15, decided to transfer the whole of its public lighting in the borough, consisting of some 140 miles of thoroughfares, from the South Metropolitan Gas Company to the County of London Electric Supply Company for a period of 15 years. The report consisted of some 18 pages on the agenda and was highly technical in parts. Yet I doubt whether the question of the lighting of the borough was decided upon its merits. To my mind the treatment of such a contract, involving nearly a quarter of a million of the ratepayers' money, was rushed through in one evening far too casually.

There are several questions that arise out of this lighting contract. First, it is a fact acknowledged by tradesmen, motorists, and pedestrians using the thoroughfares that the main roads of the borough are both admirably and efficiently lighted for all purposes. Secondly, the South Metropolitan Gas Company have but just concluded the lighting of the main roads in the heart of the borough by high-pressure, centrally-suspended lamps which come within the requirements set out in the *Interim* Report of the Minister of Transport's Committee on Street Lighting, published in October, as to height, spacing-ratio, and illumination on the roadway. Thirdly, the Company have entered into agreements with the tradesmen in the main roads in the centre of the borough for a line of the same type of lamps to be strung between the poles along the kerb adjoining their premises, thus causing the whole area to be brilliantly illuminated. If all this had been so recently done, why this quick desire for change? It is not as though the main roads were ill-lighted by old and inefficient lanterns. Moreover, the Gas Company had made an offer to install entirely at their own cost a new system of lighting throughout the borough to be completed by the end of September, giving the Borough Council the opportunity of judging its merits throughout the following winter without any obligation to the borough if not found satisfactory. The lighting was to embody the latest developments in high and low power gas lighting. The criterion by which the Company asked to be judged was the illumination of the roadway as a whole, and not the so-called test point illumination of the British Standards Specification, against which the Company have consistently protested. The question of "test-point illumination," which had been raised, was dealt with in a letter addressed to the public the previous week by the Secretary of the Gas Company, who referred to it as a "fallacy," and said that it had been answered by their Public Lighting Superintendent in a letter to the Press. This "test-point illumination" with its "pistol of light" as set out in the 1931 Street Lighting Specification is as good as dead, and should never have been introduced into the B.S.I. Specification. In the Specification under revision it will have to go.

The facts that the Gas Company had but recently finished efficiently illuminating the main roads of the area in question to the satisfaction of everybody and that the good lighting of all the main roads from the bridges south of the Thames leading to the outlying suburbs by the same Company is proverbial should have had some consideration with the Council in considering the question of re-lighting.

Yours, &c.,
PUBLIC LIGHTING ENGINEER.

Jan. 24, 1936.

Gas for Motor Transport

SIR,—Having read with considerable interest Mr. Cook's "skilful analysis" with reference to town gas as a fuel for motor transport, I note he bases his figures on 2s. 6d. per 1,000 cu.ft. Seeing that large quantities of unpurified coke oven gas are now being sold at about 6d. per 1,000 cu.ft., it would be interesting to know how it works out on that basis, as there are still large quantities of coke oven gas available for compression in big industrial areas, especially in the Midland coalfield, and even where the gas has been sold to gas-works there are at week-ends, holiday times, and during the summer large quantities which the gas undertakings (through no fault of their own) are unable to absorb.

I am sure your readers would esteem Mr. Cook's opinion as to the possibilities in this direction.

Yours, &c.,
"GAS GRID."

Jan. 23, 1936.

News in Brief

The Post of Engineer and Manager is vacant at Hebden Bridge, and applications are invited for the position, which carries a salary of £350 per annum.

Applications are Invited by the Colne Corporation for the position of Assistant Engineer and Manager to their Gas Department at a commencing salary of £300 per annum.

An Extension of the Limits of Supply is one of the main objects of a Special Order for which the Walsall Corporation Gas Department intend to apply to the Board of Trade.

Applications are Invited by a Midlands gas undertaking for the post of Assistant Manager at a commencing salary of £240 per annum, rising by annual increments of £12 to £300 per annum.

The Barbados Gas Company obtained useful publicity by securing two full-page advertisements, embodying ingenious layouts, in the free Christmas number of a magazine published by a local firm.

For Four Days last week Ramsey, Isle of Man, was without electric light. The blizzard brought down eight miles of overhead lines, and left electricity consumers without any means of lighting except candles.

Special Orders are to be applied for by the Sheffield Gas Company to provide for the sale to them of the undertakings of the Bakewell Urban District Council's Gas Department and the Barnsley Gas Company.

A Contract for the resetting during the coming year of the C.O.L. intermittent vertical chambers (put to work in 1930) at the Flathouse Works of the Portsmouth Gas Company has been placed with Gas Chambers and Coke Ovens, Ltd.

Resolutions were Passed at a meeting of Associated Gas and Water Undertakings, Ltd., held on Jan. 23, increasing the capital of the Company from £750,000 to £1,000,000. It is not proposed to issue any of the additional shares at present.

The Westminster City Council have installed a large number of John Wright's "K.C.U." gas water heaters in their new housing estates close to the Houses of Parliament, at Benett House, Page Street, and Ebury Bridge Housing Scheme, Ross Street.

The Opening Meeting of the Photometric Section of the Illuminating Engineering Society which was to have taken place on Jan. 28 has been postponed, and will take place at the Westminster Technical Institution, Vincent Square, S.W. 1, at 7 p.m. on Feb. 4, when Dr. I. W. T. Walsh will deliver his opening Address.

Among New Company Registrations during the year 1935, we note from the Annual Statistical Report just published by Jordan & Sons, Ltd., Company Registration Agents, Chancery Lane, London, that 513 were electricity, gas, or water undertakings, involving a total capital of more than two-and-a-half million pounds.

Although Fifteen Months Have Elapsed since the agreement was entered into by the Mossley Corporation and the Mossley and Saddleworth Gas Company for the sale of the Mossley Corporation Gas-Works to the Company, the sale has not yet been confirmed by the Board of Trade. Anxiety is felt in Mossley as to whether the sale will be completed before the end of the financial year in March next. Delay is being caused on account of loans, and a revised agreement has now been submitted to the Council.

Pharmacy and Poisons Act Rules and Orders

"Kleenoff" Included in Exemptions

The Poison Act will restrict the sale of several household commodities other than through authorized or licensed sellers, and as it is quite probable that many gas undertakings will be in doubt as to whether "Kleenoff" is affected, we are able to state that the Pharmacy and Poison Act, 1933, and the subsequent statutory rules and orders do not in any way affect the sale of "Kleenoff" by gas undertakings.

We are informed by the Kleenoff Company that their product is included in Group 2 of special exemptions.

Metropolitan Companies' Dividends

The Gas Light and Coke Company.

The Accounts of the Gas Light and Coke Company for the past year show that the balance to the credit of the net Revenue Account will enable the Directors to recommend the payment of dividends for the half-year to Dec. 31 last as follows:

	£	s.	d.	
On the 4% consolidated preference stock at the rate of	4	0	0	% per annum
On the 3½% maximum stock at the rate of	3	10	0	,, ,,
On the ordinary stock at the rate of	5	12	0	,, ,,

carrying forward to the next Account the sum of £202,623 13s. 2d.

Commercial Gas Company.

The Directors of the Commercial Gas Company at the Annual General Meeting on Feb. 20 will recommend a final dividend of 2½% (less income-tax) on the ordinary stock of the Company, making, with the interim dividend of 2½% paid in August last, 5% for the year to Dec. 31, 1935. The dividend for the previous year was at the rate of 5½%.

South Metropolitan Gas Company.

Subject to audit, the Directors of the South Metropolitan Gas Company will recommend at the forthcoming Annual General Meeting a final dividend of 3¼% on the ordinary stock of the Company, making with the interim dividend of 2½% paid in September last, 5¾% for the year ended Dec. 31, 1935.

The Institution of Gas Engineers

Overseas Gas Organizations' Sympathy

The Institution of Gas Engineers have received the following Telegrams of Condolence from overseas gas organizations on the death of His Majesty King George V.:

From the International Gas Union.

The International Gas Union sends to The Institution of Gas Engineers and to its British Colleagues its deep and sorrowing sympathy on the loss of their illustrious Sovereign.

PRESIDENT BARIL,
International Gas Union, Paris.

From the French Gas Union.

Your French Colleagues, deeply moved at the loss of your illustrious Sovereign, share your feelings of grief and send to their British Colleagues an expression of their feelings of sorrow and sympathy.

PRESIDENT LACHOMETTE,
French Gas Union, Paris.

From the Belgian Gas Association.

In the name of the Members of the Belgian Gas Association, I join with the British Nation and Empire in deeply mourning the loss of their beloved Sovereign. I ask you to transmit to the Members of The Institution of Gas Engineers the sincere condolences and the expression of the sorrowing sympathy of their Belgian friends.

PRESIDENT WELVAERT,
Belgian Gas Association, Brussels.

From the Polish Gas and Water Association—

Very afflicted with the news of the death of His Majesty King George V. We are united with you in the Mourning of your Country and send you our deep condolences.

PRESIDENT,
Polish Gas and Water Association.

The British Commercial Gas Association

Silver Jubilee This Year

The British Commercial Gas Association is celebrating its silver jubilee this year, having been formed in the last quarter of 1911. Sir Francis Goodenough, who was largely responsible for the foundation and organization of the Association, has been Executive Chairman throughout the 25 years of its operation and will, therefore, be celebrating his silver jubilee in the national service of the Industry in the autumn of this year. We understand that it is the intention of Sir Francis to retire from the work and responsibilities of Executive Chairman as from Dec. 31 next. We are glad to learn, however, that Sir Francis hopes to continue many of his public activities, particularly in the cause of improved education for commerce and industry, and we are quite certain that the Gas Industry will not lose the driving force of Sir Francis Goodenough's enthusiasm and experience.

[An editorial comment on Sir Francis Goodenough's retirement appeared in last week's issue.]

Postponed Business Meetings

The following meetings which were to have been held yesterday have been postponed by reason of the death of King George V.:

Southern Association of Gas Engineers and Managers (Eastern District).

Meeting postponed until Tuesday, Feb. 4, 2.30 p.m. Committee meeting preceding at 12 noon.

Illuminating Engineering Society.

Dinner postponed until Tuesday, March 24; Trocadero Restaurant, Piccadilly Circus, W. 1. New tickets will be sent upon application.

B.I.F. Banquet Cancelled.

The Department of Overseas Trade announce the cancellation, out of respect for the memory of His late Majesty King George V., of the banquet which, by the courtesy of the Lord Mayor, was to have been given by His Majesty's Government at the Mansion House on Feb. 17 to mark the opening of the British Industries Fair of 1936.

The Institution of Gas Engineers

Grey Books.

Continuing the series of Grey Books of the Institution, the following Reports have been re-issued to include the verbatim record of their Presentation and Discussion at the 7th Autumn Research Meeting. Copies can be obtained, price 2s. each, from the Secretary, The Institution of Gas Engineers, 28, Grosvenor Gardens, S.W. 1:

117/20 Report on the Generation of Hydrogen Sulphide in Water-Sealed Gasholders, by the Gas Light and Coke Company and the South Metropolitan Gas Company.

119/21 12th Report of the Gas Education Committee, 1934-35.

120/22 1st Report of the Research Executive Committee, 1934-35.

121/23 36th Report of the Joint Research Committee of the Institution and Leeds University. Corrosion from Products of Combustion of Gas—Part III. Tube Experiments (continued).

122/24 37th Report of the Joint Research Committee of the Institution and Leeds University. The Controlled Operation of a Carburetted Water Gas Plant—Part II.

123/25 5th Report of the Liquor Effluents and Ammonia Committee, embodying (i.) Ammonium Bicarbonate, and (ii.) The Treatment of Gas-Works Liquors in Admixture with Sewage.

124/26 26th Report of the Refractory Materials Joint Committee.

125/27 1st Report of the Joint Lighting Committee; Investigation of the Factors Affecting the Performance of Gas Street Lamps.

126/28 1st and 2nd Reports of the Meters Committee; The Institution of Gas Engineers' Specification for Gas Meters for Domestic Consumers.*

127/29 Institution Gas Research Fellowship Report, 1934-35. The Scaling of Mild Steel in Sulphur-Free and Sulphur-Containing Furnace Atmospheres, by H. C. Millett, Ph.D. (Research Fellow), and John W. Cobb, C.B.E., B.Sc., F.I.C. (Livesey Professor).

* Copies of the Reports and Specification without the Discussion can be obtained from the Secretary without charge as long as the supply lasts.

Widnes Corporation Gas Department

Schedule of Gas Appliance Sales during the Nine Years ended Dec. 31, 1935

We are indebted to Mr. C. E. Dickinson (Engineer and Manager of the Widnes Corporation Gas Department) for the following illuminating schedule showing the sales of various gas appliances by his Undertaking during the nine years ended Dec. 31 last.

Year.	Cash.	Three Years Hire Purchase.	Five Years Hire Purchase.	Total.	Fires.	Cookers.	Boilers.		Grillers.	Radiators.	Geysers.	Heaters.	Washers.	Gas Irons.
							Sold.	Simple Hire.						
	£	£	£	£										
12 months ended Dec.—														
1927 (*a*) . .	781	1,711	1,056	3,549	519	183	67	..	18	..	..	..	..	..
1928 . . .	656	1,221	2,080	3,958	268	204	85	..	9	..	..	..	..	..
1929 (*b*) . .	674	1,397	2,816	4,888	236	245	132	..	14	10	13	..	10	..
1930 . . .	840	982	4,027	5,849	186	434	131	..	19	14	13	3	2	..
1931 (*c*) . .	1,078	1,083	5,714	7,876	250	474	175	..	..	44	10	9	..	47
1932 (*d*) . .	928	931	8,341	10,201	262	810	307	170	..	29	18	32	25	67
1933 (*e*) . .	931	619	13,763	15,314	289	1,255	155	278	..	78	201	163	13	77
												2 Refrigerators		
1934 (*f*) . .	1,316	535	4,777	6,629	252	358	142	158	..	60	160	7	7	190
1935 . . .	1,324	549	5,316	7,191	306	369	163	121	..	68	191	22	5	154
Total . .	8,533	9,033	47,894	65,460	2,568	4,332	1,357	727	60	303	606	236	62	535

NOTES.

(*a*) December, 1926 . Gas and water fittings showrooms opened.

(*b*) May 24, 1929 . . Geysers, water heaters, circulators, and radiators supplied from this date upon the hire-purchase system, 3 or 5 years' period.

(*c*) September, 1931. Gas fires—hire-purchase system, re-payment period extended to 5 years. Previously 3 years only. Cost of fixing also payable over hire-purchase period.
September, 1931. Boilers and radiators supplied on the "fixed free" basis, re-payment extended to 5 years. Previously 3 years only.
September, 1931. Gas irons sold on cash and 3 years' hire-purchase terms, and, from Nov. 2, 1931, supplied on "fixed free" basis. Prior to September, 1931, supplied on cash basis only.

(*d*) July 15, 1932 . . W. 794 boilers, ordinary finish, without D.O.T., let at simple hire rent of 1s. 6d. per quarter.
October 12, 1932. No charge made to slot consumers for extra lighting positions, provided burner, mantle, and globe are purchased for each position.

(*e*) March 1, 1933 . Distribution workers Commission Scheme commenced.

(*f*) November, 1934 . Prepayment consumers allowed to pay for burners, mantles, and globes—fixed to new pendants—by means of a lower meter setting.

Total number of pendants and brackets fixed in place of electric 498
Total number fixed in place of C S. pendants and upright brackets, including new positions 1,193

Total 1,691

A Low-Pressure Gas Lamp

WITH FORCED PRIMARY AIR SUPPLY

by
D. G. SANDEMAN, B.Sc., A.M.I.E.E.
(Assistant Inspector of Lighting, Edinburgh)

As a matter of interest we publish this description of a gas-cum-electric lamp developed by the Edinburgh Corporation Public Lighting Department and which is now in service in that City. Doubtless to many the application of two competitive sources of energy will appear strangely complicated, and the idea will not appeal on the scores of maintenance and reliability. Our purpose in publishing the article is to keep readers aware of what is occurring in the lighting field, and the description may provoke thought and criticism.

Fig. 1 shows the lamp assembled for test. It is the "Supervia" lamp, from which the venturi tube and injector have been removed and an air supply tube substituted, which narrows gradually from 1 in. at the top to ¼ in. diameter in the middle, thereafter enlarging abruptly

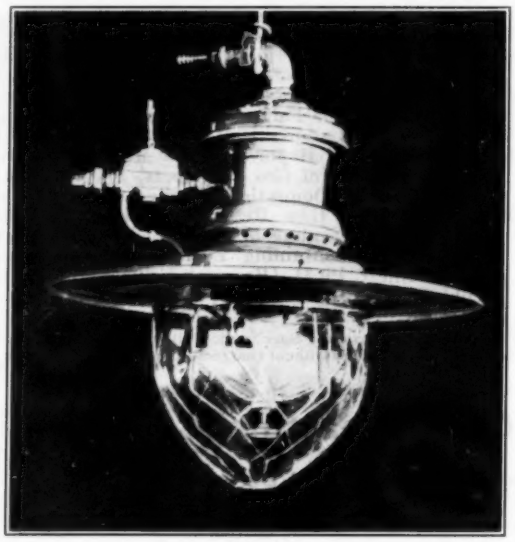


Fig 1.

to 1 in. diameter. Low-pressure gas is led in through the aperture provided in the "Supervia" lamp for the choke and enters the air supply tube at its narrowest part.

Results obtained in the laboratory are shown in fig. 2, which illustrates the polar distribution in the main beams, taken in a vertical plane. Gas (0·107 therm/hour) is supplied at 3·5 in. pressure. The air pressure, 4 in., is provided by a small electric fan consuming 60 watts at 230 volts.

The first experiments were carried out using the fan to blow mixture, and very promising results were obtained. The Author would remind readers that two factors contribute to obtaining the best results—good mixing and velocity of mixture in the nozzle. The velocity must be adjusted to correspond with the speed at which the flame travels back. The hottest flame and most rapid in travel is obtained by mixing intimately with the gas sufficient air for complete combustion. A fan is appropriate for this purpose, giving both intimate mixture and any required nozzle speed.

The air fan was adopted with a view to simplicity and safety. The operation is as follows: When the electric current is switched on, the fan motor starts, the air pressure then rises, and when it reaches 3 in. the gas supply is turned on by means of the pneumatic valve, which can be seen in fig. 1. Ignition is by means of a by-pass.

The type of motor used is a Universal 1/30 B.H.P. 3,500 r.p.m. ball-bearing machine, carrying a 7 in. diameter fan rotor. The Universal type is not the best for this purpose, but was the only type available readily from stock. A type of motor known as the induction fan type, designed to run at a speed of 2,800 r.p.m. can be manufactured for a duty such as this, and, having no commutator, and constant speed characteristics, is admirably suited to lamp service conditions.

The makers claim for the Universal motor that the brushes will serve for twelve months without renewal, and, as no means of bearing lubrication is provided, it is assumed that the bearings will require little attention. It will be interesting to see what service is obtained under working conditions.

The lamp described in this article has just been placed in service in the street, and up to the time of writing has been giving satisfaction. The fan and motor are mounted inside the lamp standard, which has an internal diameter

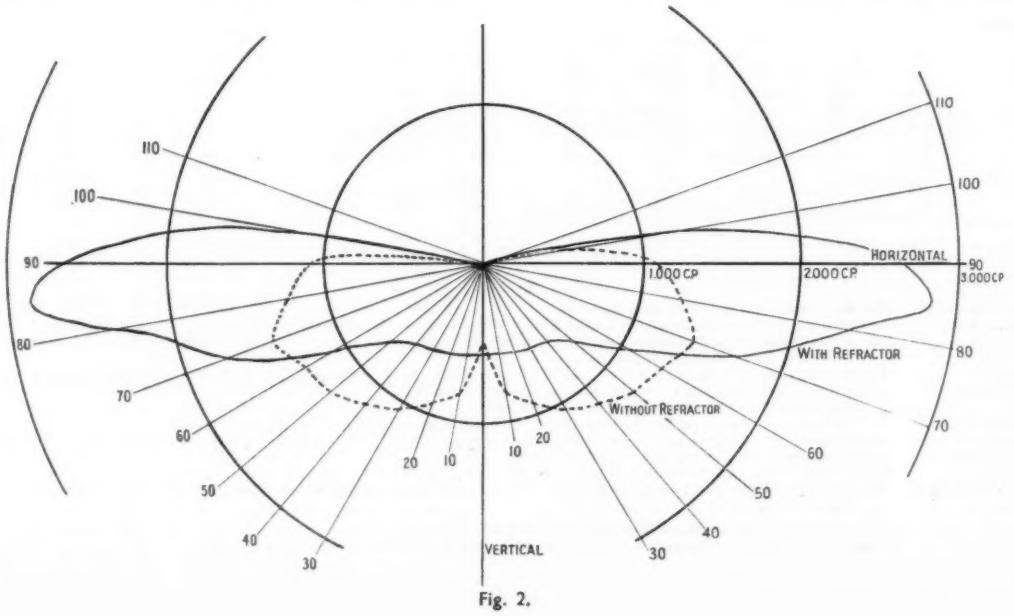


Fig. 2.

of only 9 in. The gas service, after passing a joint which provides electrical insulation, is led up the outside of the lamp standard. The air is blown through a 1-in. rubber hose to the top of the pillar, where it enters a ¾-in. steel pipe connected to the lantern. Approximately ½-in. pressure is lost in the air main.

The motor is protected by means of a 100-watt 150-volt lamp, which acts as both resistance and fuse.

It has been suggested that the pillar itself could be used for the air, eliminating the air tubing.

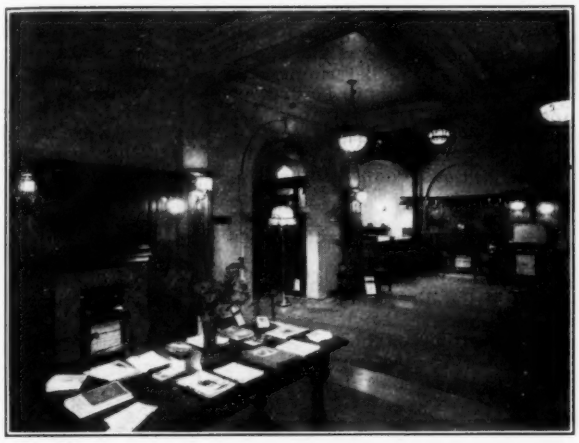
An experiment was tried, using the high-pressure lamp unaltered, but using air at 3 lb. per sq.in. and introducing low-pressure gas with the primary air, or, should we say, "secondary" air. Promising results were obtained. Such a system might also find an application.

It is probable that the Report recently published by the Ministry of Transport, recommending a mounting height of 25 ft., will encourage the production of lamps of 10,000 lumens and upwards. The Author believes that this development has been retarded by the employment of a type of injector which is inefficient. The sudden enlargement from the minute bore of the nipple to the full diameter of the mixing chamber, while it causes turbulence and therefore good mixing, leaves insufficient energy to speed the mixture through the nozzle of the burner.

Averaging the pressures by allocating four parts to air and one to gas, the following comparison is obtained:

H.P. lamp (gas at 3 lb. per sq.in.)	19·4 in.
Lamp with L.P. gas (3·5 in.) and air at 4 in . .	3·9 ,,
Ordinary L.P. lamp	0·7 ,,

Patents have been applied for in respect of this lamp.



A view of the attractive interior of the Maidstone Gas Company's Showrooms.

Sales Activities at Maidstone

Week's Film Display Attracts Large Audiences

A few notes on what is being done at Maidstone to stimulate interest in gas and to further the sales of domestic appliances.

Gas Undertakings who still have any doubt as to the value of the B.C.G.A. Film Displays may be interested to learn of the excellent reception a week's programme has had at Maidstone—and this during a period which in many areas is regarded as a somewhat slack one. It is, of course, difficult to ascertain how many sales directly accrue from such displays, but there is no doubt whatever that they attract an enormous amount of interest and definitely keep the gas undertaking before the public eye.

The Maidstone Gas Company secured the local Corn Exchange Concert Hall during a whole week recently, and a Western Electric portable talking-picture apparatus was specially installed for the show. The Hall seats over two hundred people, and as the week progressed larger and larger attendances were recorded, until every available seat was regularly filled. Announcements appeared in the local Press, notices and leaflets were issued, and invitations were sent out to every consumer as well as to local schools and other institutions, and several large parties of school children, in some cases more than a hundred at a time, took the opportunity of witnessing the performances, which seems to indicate that those responsible for the education of the rising generation see something of value in such a programme.

Admission to the displays was free, and two performances were held daily—at 3 p.m. and 7.30 p.m.—and the full programme occupied two hours, which made it an entertainment well worth attending. Interspersed among a series of films of topical interest and of a humorous nature were the following pictures relating more particularly to the Gas Industry: "The Romance of a Lump of Coal;" "Men Behind the Meters;" "Dinner Hour;" "How Gas is Made"—the whole comprising a nicely balanced programme, carefully prepared by the B.C.G.A. to provide a variety of films well calculated to be of general interest to the public, and to give an entertainment of reasonable length.

Near the entrance to the Hall was displayed a representative selection of modern domestic gas appliances, and while the Company wisely made no effort to "sell" to those attending the films, salesmen were ready on the spot to explain or demonstrate any appliance in which interest was shown by those present. Indeed, some useful enquiries resulted, particularly in respect of the "plug-in to gas" theme which is mentioned in the "Men Behind the Meters" film. The Company deliberately set out to provide an *entertainment* in this series of film displays and thus avoided any possible accusation of attracting people to a "free show" in order to get them to buy appliances. And to this end they succeeded in doing very good propaganda work. Film displays of this nature are, of course, an excellent subsidiary to gas exhibitions, where the exhibition itself is the primary function; so in this respect the Maidstone Company chose the right course in making no direct effort to "sell" at the displays. In fact, those attending the performances were "left severely alone."

Sales activities generally are progressing well at Maidstone, particularly good business being done with a mottled enamel cooker which is being offered to slot consumers for 5s. down and sixty monthly instalments of 2s. If the "Maidstone" cooker, as it is called, is fixed in the place of an existing cooker a rebate of 3d. per 1,000 cu.ft. is allowed, which, of course, is of assistance in paying for the appliance itself. Allowances are also made by the Company in respect of old fires being replaced by new ones, and there is a steady demand for the latest self-lighting types. All types of gas water heater are available on hire in the area, and there is quite a good water heating load. Though it is mid-winter, several refrigerator sales have been effected lately, one of these being obtained in a rather interesting way. A local tradesman had in stock a fairly large consignment of perishable foodstuffs at the end of a week. He approached the Gas Company and asked whether they would be so kind as to keep them in one of their refrigerators for him over the week-end. On the Monday morning, when he returned to collect his goods, he was so impressed by the fresh condition in which he found them that he immediately ordered a refrigerator for his own business.

The Company have very attractively laid out and spacious showrooms on the main road. The premises are comfortably furnished, and the various types of gas appliances are neatly displayed in groups, a section being set apart for water heaters, where all types are available for demonstration. On the first floor is a large demonstration theatre. Particular attention is paid to window displays by the Maidstone Company, who are fortunate in having two big windows. They have ingenious layouts to link up with almost every important local and national event in the calendar, while special displays are also staged in connection with local affairs of topical interest.

The Maidstone Company have taken up the agency for Calor Gas in the district. Two installations are in hand, while there have been several further enquiries.

Altogether, under a progressive sales policy, gas affairs are going along very well in Kent's capital.

Automatic Control

OF HOT WATER AND CENTRAL HEATING INSTALLATIONS

by
F. M. H. TAYLOR,
Ph.D., B.Sc.

From a Paper presented before a Sessional Meeting in London on Jan. 8 of the Institution of Heating and Ventilating Engineers.

Automatic controls may not just be considered as ends in themselves. Central heating is very often considered by the public to give a stuffy feeling, and a number of people are delaying installing a central heating system because of the lack of efficient controls or because they base their running costs on a system which is inefficient. The vagaries of the climate—sun, wind, frost—must be catered for by suitable automatic appliances so that the provision of a warm and comfortable temperature is made certain and automatic, and the provision of adequate controls will prove to be a valuable factor in popularizing heating installations.

The Advantages of Automatic Controls.

The advantages of controls are that they avoid overheating, give a saving in fuel, ensure sufficient heating, take account of wide changes in climatic conditions, take account of body heat, take account of heat from lights, or heat from other casual sources.

The effect of controls on fuel consumption may be illustrated by the accompanying graph (Fig. 1) which show—

(*a*) outside air temperature;
(*b*) room temperature as maintained by control;
(*c*) room temperature as maintained by a boiler whose flow temperature is kept constant.

It is obvious that the relative quantities of fuel used are proportional to the area between the curve formed by the temperature of the room and the outside air temperature. This temperature is obviously much higher for the uncontrolled source of heat than for the fully controlled. This is more accentuated in warmer weather than when freezing outside.

It might be mentioned that the excess heat during the warmer part of the heating season is usually dissipated by opening windows rather than by reducing the boiler temperature. The fuel saving resulting from the installation of thermostatic control as calculated from the accompanying graphs is 20%.

The effect of a change of heating system, allowing for one being subject to a finer degree of control than another, may also be considered.

Automatic controls, with or without automatic recording devices, are essential when heat, steam, or hot water are sold by contract. The type of all-in contract whereby a servicing company supplies heat to a block of flats, or hot water for the use of the tenants, depends for its success on a means of determining an exact temperature at which the building is to be kept or the hot water is to be supplied, as the case may be. This can only be done by the installation of suitable controls which may be tested at any time, and which, under normal operation, maintain a predetermined temperature irrespective of external conditions.

Essential Characteristics of Controls.

These may be summarized as follows:

(*a*) Reliability.
(*b*) Simplicity.
(*c*) Positive action.
(*d*) Self-proving.
(*e*) Gradual control when required.

(*a*) *Reliability.*

The need for reliability in controls is obvious and does not need further discussion.

(*b*) *Simplicity.*

An example of what is meant by the simplicity of controls is shown by the difference between a hopper-feed boiler and standard boiler fired by an automatic stoker. The hopper-feed boiler required control of the dampers only, a straightforward and simple matter, whereas automatic stokers require control of the fuel feed and primary air supply, which entails either intermittent feeding or variable speed feeding of fuel as well as air supply, and the proportion of fuel to air must be also regulated—a

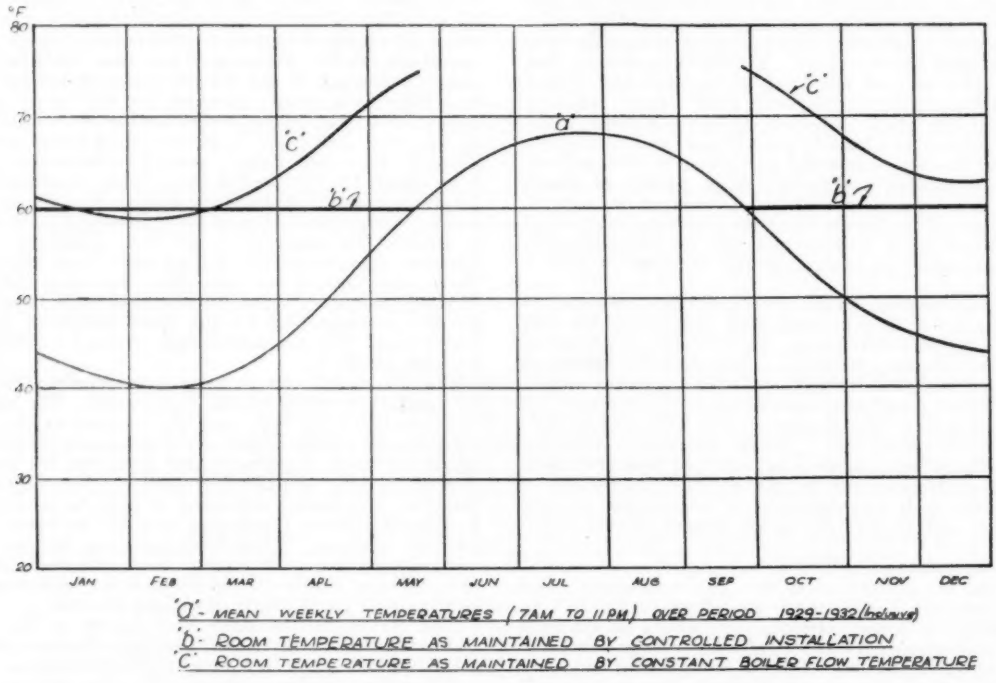


Fig. 1.—Graph Illustrating Fuel Saving Due to Temperature Control.

very difficult matter when operating under varying conditions of load.

(*c*) *Positive Action.*

A good example of positive action in the heating field as distinct from non-positive action is the thruster unit, which is the largest and most powerful type motor used for control work and consists of a small centrifugal pump directly-coupled to a fractional horse-power motor and connected to a hydraulic ram, the whole unit being built in one casing. With this type, when the motor and pump run, the fluid (usually transformer oil) is forced under the ram, which lifts the dampers or valves. Failure of the electricity, whether deliberate or accidental, stops the pump allowing the weight of the ram and connected mechanism to force the oil back into the reservoir.

Any break-down of the motor will also close the dampers which can be so heavily weighted that there is no risk of them failing to close once the current has been cut off. Supposing the action of the thruster to be reversed so that the motor operated to close the dampers, any break-down or failure would leave the dampers open and a dangerous position would develop.

(*d*) *Self-Proving.*

In order to ensure reliability, a safety device should be self-proving. The electro-magnetic safety release for damper control in one type is not self-proving in that it only releases the dampers as power fails or is switched-off at the main, whereas in the second type the thermostat itself when closing the dampers also shuts off the power to the holding coil and thus closes the dampers by means of the safety release. In other words, the device comes into operation on every normal cycle of operations, so that if it fails it would be noticed immediately, whereas in the first circuit it only operates in the event of emergency, and should any trouble develop it would not be noticed until it had failed to operate in time of emergency. It would not be safe to rely on an attendant inspecting the device regularly, as he may neglect to do his duty in this respect.

(*e*) *Gradual Control When Required.*

The advantages of gradual operation of the control, thus obtaining small slow variations in temperature as opposed to the "on" and "off" type of control, are best illustrated by the following examples:

Where warming is done by means of hot-water radiators, the heating is mainly by convection, and the air temperature has to be raised to a comfortable degree and held steadily at this point, whereas with radiant-type heaters, such as electric or gas fires, the warming is chiefly by radiant heat played directly on the person, the air temperature usually being considerably lower than that required for comfort, when convection heaters alone are used. Radiant heaters, therefore, require a gradual type of control, while with central heating by hot water or steam, an intermittent type of control would be allowable.

Details of Automatic Control Systems.

Automatic control systems can be operated by

(*a*) *Temperature* by means of a thermostat, the sensitive element of which must produce sufficient movement and power over the range of operating temperatures to actuate the controlling device either directly or indirectly.

(*b*) *Pressure.*

The pressurestat is a simple development of the vapour-pressure thermostat. A metal bellows, leather diaphragm, or inverted metal-bell float are the methods used to transmit the movement.

(*c*) *Humidity.*

The humidistat and hydrostats are operated by changes in tension of human hair, wood, pine-cone fibre, and other materials. The alternative method is the wet- and dry-bulb thermostats which depend on the varying rates of evaporation of water, according to the humidity of the air.

(*d*) *Weather.*

For indoor comfort, a regulation of the heating system of a building, according to the changes in outdoor conditions is advantageous. The instrument most used in this country is the "variostat."

An American control known as the "weatherstat" responds, it is claimed, to all four outside weather factors —temperature, wind direction, wind velocity, and solar radiation. It consists of a mass of iron arranged to house a thermostatic element, electric contacts and electric heating elements, and is in reality equivalent to a room out of doors with the same heat-loss rates as the zone or building which it controls.

(*e*) *Radiation.*

The eupatheostat as a room control takes into consideration not only the air temperature but radiant heat from panels or negative radiation from cold walls, &c., thus estimating the heating effect as the occupants of the room will feel it.

(*f*) *Time.*

Impulses can be given at predetermined times by means of time switches, driven by spring motor or electric synchronous motor.

Time switches operated by spring motor or synchronous motor will, on the other hand, switch "on" and "off" entirely automatically at predetermined intervals, and can even be arranged to remain inoperative at any given time such as during the week-end.

The Control of Solid Fuel. On Natural Draught.

The rate of combustion is regulated by the automatic operation of the dampers by:

(*a*) *A self-acting thermostat* consisting of a temperature-sensitive element containing a liquid or a paste having a sufficiently high coefficient of expansion or a volatile fluid generating a vapour pressure sufficient at the working temperature to operate the dampers direct through levers and chains. The small amount of movement and power obtainable from these devices limits their use to small boilers of the domestic class used primarily for hot-water supply. For larger installations it is necessary to utilize an outside source of power such as electricity, water, or compressed air.

(*b*) *Hydraulic and Pneumatic Controls.*

These comprise a power unit operating the dampers and a thermostatic pilot valve controlling the admission of the water power to the unit or its release to waste. The power unit can take the form of a cylinder with close-fitting piston, or a diaphragm mounted in a housing with a return spring and connected mechanically to a lever arm. For the sake of safety these controls should be so designed that the water pressure opens the dampers; in the event of a failure of the water supply, the dampers return to the closed position. The water supply should be cut-off from the power unit should the thermostat fail. This latter condition is difficult of attainment with the expansion-type thermostat in that if the thermostat loses some of its filling through leakage, it fails to expand and therefore remains in the "cold" position, which, for normal operation, must correspond to the "dampers open" position.

This difficulty has been overcome in one make of control by so constructing the pilot valve that it cuts off water from the power unit not only when the maximum temperature is reached, but also at a low temperature corresponding to absence of expansion in the thermostat. The only slight disadvantage is that in starting up from cold, the damper doors require to be propped open until the operating temperature is approached, and the thermostat starts to expand.

Another type of fluid motor, designed primarily for damper control on low-pressure steam-heating systems comprises a hydraulic cylinder with a diaphragm-operated pilot valve. The piston and the diaphragm are connected through a compensating spring in such a manner that the setting of the pilot is changed for each position of the piston. In this way a gradual floating motion is obtained.

(*c*) *Electrically Operated Controls.*

There are three main types of purely electric motors available for control work.

1.—Constant direction low-wattage motors with built-in gearing and limit switch which stops them at each half revolution of the final drive. These motors are approximately one-thirtieth H.P. and take 30-50 watts while running, it being appreciated that the motor only runs while actually moving the dampers or valve.

The waste controller provides for four positions of the dampers—open, closed, and two intermediate positions—the operation being as follows:

Assuming temperature conditions are satisfied and the dampers closed, a slight fall in temperature causes the thermostat to operate the motor to the first intermediate position—one-third open. If this is sufficient to check the falling temperature, the dampers are held in this position until the temperature rises, whereupon the motor returns the dampers to the closed position. Should, however, the temperature continue to fall, the motor opens the dampers a further step to two-thirds open, and—if necessary—full

open. With a rise in temperature, the motor is made to move the dampers step by step towards the closed position.

2.—*Teddington Stalling Motor.*

Small one-way or reversible motors fitted with built-in gearing are arranged to stand stalled with power on without danger for more or less indefinite periods. These, also, are of low power consumption, about 30-50 watts, but in this case the current is on the whole time the valve or dampers are in the open position, or as required.

3.—*Heat Motor.*

This type of motor consists of a vapour-pressure system fitted with a small electric heater round the vapour bulb. The expansion of the fluid and therewith the movement of the operating arm is controlled by the heater. This type of motor usually requires a low voltage—20-30 volts—and takes about 20 watts. It has the same advantage as the stalling motor of being self-closing on failure of power, but is rather slow acting and has comparatively small power.

4.—*The Electro-Hydraulic Thruster.*

The thruster unit has been described in an earlier section of the Paper. The advantages are its very large power combined with sensitivity and safety. Its chief disadvantages are, however, its large size and high cost compared with the other types of motor and the fact that the power consumption which is in the neighbourhood of 150-200 watts is being used the whole time the dampers are open.

The " Wilbin."

An improved type of this device has recently been developed and provides a gradual operation of the dampers. The current consumption of this type is also more in line with other units—namely, 25 watts—while the dampers are in any position other than closed. The gradual operation is obtained by a multi-contact thermostat connected to an interruptor on the operating stem of the power unit. When the thermostat makes circuit through one of the contacts, the dampers are driven open until the corresponding interruptor contact is reached by the arm on the motor stem. Above this point, the electric current is broken and the steam cannot, therefore, rise any further but holds the dampers in this position until the contact arm in the thermostat moves to another contact.

Another form of electro-hydraulic control is similar to the hydraulic control comprising thermostatic pilot valve and cylinder. In this case, however, the pilot valve is electrically operated and can therefore be controlled by a room thermostat or other thermostat at a distance from the boiler. The valve is a 3-way pattern and either admits water to the cylinder or releases it to waste as required by the controlling thermostat.

Forced Draught.

It will, of course, be appreciated that the methods and equipment used for the control of dampers can also be used for controlling a forced or induced draught fan. Usually, however, it is necessary to insert a relay between the thermostat and the fan motor, because the current to be broken when shutting off is greater than the thermostat can safely handle.

Diaphragm Motors.

As their name implies, these consist of a cast-iron chamber fitted with a rubber or leather diaphragm, to which is connected a lever mechanism. The movement of the diaphragm, and thus the lever, is produced by air or water under slight pressure and controlled by a suitable thermostatic valve.

Thermostats.

Electric and electro-hydraulic damper-operating motors offer very wide scope in the choice of the controlling thermostat. Reference has already been made to the main operating principle of thermostats, metal expansion, and vapour pressure, and further details will now be given of the various forms of thermostatic switches available for the control of boilers according to room or water temperature.

The vapour-pressure type is generally too bulky for use as a room thermostat and is less sensitive than the bi-metal type. In view of the fact, however, that it can be made weatherproof with the sensitive element fully exposed, it is eminently suited to control by outdoor temperature.

When fitted with a capillary-tube connection between the sensitive element and the bellows and switch, it lends itself to fitting on to control panels and enables the sensitive element to be installed in the most favourable position from the point of view of control and yet have the switch-box and temperature adjustment mounted in a convenient place.

Its advantages and disadvantages may be summarized:

Advantages.

Simplicity.
Gradual action.
Power transmitted to distance by capillary action or electricity.

Disadvantages.

Low effective power due to small movement.
Sluggish action, comparatively insensitive.

Metal expansion thermostats are of two types, bi-metal and rod and tube.

The bi-metal type thermostat usually consists of two thin strips of dissimilar metals welded or riveted together rigidly fixed at one end, the other end being free to move between two electric contacts or to control a pilot supply.

Because of their sensitivity and their compactness, they are most generally used for room temperature control.

Advantages.

Very sensitive.
Conductor of electricity.
Compact.
Easily installed and adjusted.

Disadvantages.

Movement too small for direct use except very small valves.

The Rod and Tube Thermostats.

These thermostats are a variation of the bi-metal thermostat inasmuch as their movement is obtained by the difference in expansion between two dissimilar materials. In their usual form, they consist of an " Invar " rod which is placed inside a brass tube, the two being rigidly connected together at one end, the other ends being connected to the switch to be operated and the casing of the unit respectively.

They are largely used for control of water temperatures and are very sensitive providing a reasonably long stem can be accommodated. It will be appreciated that the longer the stem, the greater the movement per degree temperature change available to operate the switch.

Advantages.

Particularly suitable for long stems as for ovens, tanks, &c.
Sensitive.
Easily installed and adjusted.

In addition to the numerous designs of bi-metal room thermostats which are on the market, one or two special types have been produced with a view to reducing the time lag between the call for heat by the thermostat and the response of the heating system. This is accomplished by the passage of the electric current through the sensitive element of the thermostat, which amplifies the movement of the element.

Variostat.

The variostat varies the temperature of the water in a heating system according to the outdoor temperature, and it can be applied to boilers with any type of firing—*e.g.*, solid fuel, gas, or oil.

Principle of Operation.

The instrument consists of a Bourdon tube connected by flexible tubing to two bulbs, one of which is mounted outside the building and the other in the boiler or flow pipe. The whole of this system is filled with a liquid sensitive to temperature changes, the two bulbs being so proportioned that the Bourdon tube is actuated when the water temperature reaches that required to maintain a comfortable room temperature. Owing to the influence of the outdoor bulb, the flow temperature is varied to suit the prevailing weather conditions. It should be noted that the flow temperature is adjusted immediately a change in outdoor temperature occurs and before the room temperature varies; also the opening of windows in any one room does not affect the instrument in any way, all other rooms being maintained at the most comfortable temperature. Owing to the influence of the outdoor bulbs, the instrument has the effect of " anticipating " the needs of the rooms, and adjusts the boiler accordingly.

The instrument can be fitted with:

(1) A mercury switch for electric controls.
(2) A pilot valve for hydraulic or gaseous controls.

Electric heaters may be controlled by essentially similar thermostats.

Arrangement of Automatic Controls for Small Gas-Fired Units such as Radiant Panels or Gas Radiators.

These units can be controlled either in single units or in blocks of several units.

1.—*Single Unit Control.*

Each heater has a separate relay valve controlled by a separate thermostat detector. This system is suitable where only a few heaters are needed and the distance between is fairly large. If a large number of heaters is to be controlled thermostatically, the block system is adopted to reduce the cost of the relay valves and detectors.

2.—*Block Control.*

The heaters are so arranged that thermostatic control is effected by a single detector and relay valve.

The relay valve controls the gas supply to a number of heaters, and the whole block is controlled by a single detector. It should be noted that a separate pilot main is necessary, the supply to which is taken from the supply side of the relay valve.

It should be borne in mind that if a large hall is being heated, it is best to sectionalize instead of attempting to control the whole hall from a single detector, as this may lead to the hall being warmer in some parts than in others.

Draught and Combustion Control.

Draught Stabilizers.

An essential for accurate temperature control is a constant draught on the flue side of the controlled boilers.

Chimney draught is variable, due to changes in the weather—wind, barometric pressure, temperature, &c., therefore some form of draught stat or stabilizer should be provided to counteract the effect on the rate of combustion.

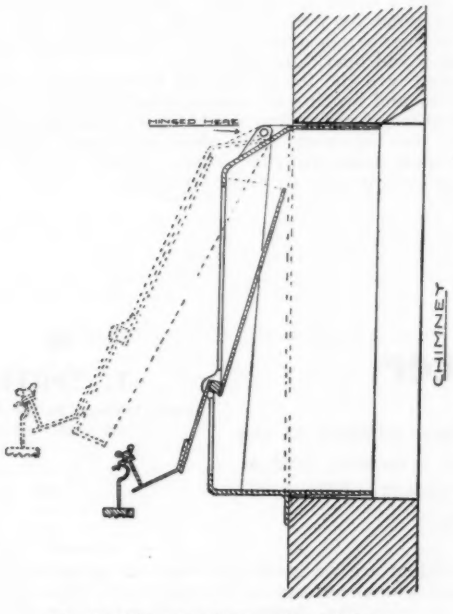


Fig. 2.—The "Ivo" Draught Stabilizer.

One form of stabilizer—the "Ivo"—consists of a carefully balanced aluminium plate pivoted above its centre of pressure and fitted with adjustable weights, by means of which the stabilizer can be set to maintain the required draught conditions. Any increase in chimney draught opens the stabilizer and admits cool air, thus reducing the draught.

The Draughtstat.

This is provided with an indicator by means of which the "stat" can be conveniently set to the desired draught, any excess being by-passed so that its effects do not disturb the air supply necessary for the rate of fuel consumption required.

The "Reco" and the "Carrick."

On large boilers, or boiler batteries, this simple form of stabilizer may prove unsuitable, due to the large size required or other installation difficulties. An alternative method is to operate the main-flue damper from a device sensitive to draught, operating a motor connected to the damper.

Obviously auxiliary energy, such as electricity or water under pressure, has to be used owing to the sensitivity and consequent small power of the draught stat.

The motor could be any of the types described in the earlier section of this Paper.

The McWilliams Draught Regulator.

This is a rotary check damper fitted with a bi-metal thermostat made in the form of a spiral, one end being rigidly fixed to the casing and the other to the spindle of the damper shutter. The unit is fitted into a tee in the smoke pipe with the bi-metal element well in the path of the hot gases. As the element warms up, it expands and rotates the shutter, admitting cool air to the flue and reducing the draught through the fire.

Gas Boiler Efficiency.

One is frequently asked if the efficiency of a gas boiler is maintained when working at the by-pass rate at which the boiler will probably be working for the greater part of its life. The answer depends on the type of boiler considered. Those with forced or induced draught normally burn only a pilot, the cost of which is negligible, once the thermostat has cut in, and may be said to all intents and purposes to have a constant efficiency. The natural-draught type may drop in efficiency of heat transfer to 70% or even 60% at by-pass rate (say, 10% of full gas rate).

It will be seen that, owing to the fact that the gas rate at the by-pass is relatively low, the drop in overall efficiency is slight—for normal usages of the order of a few per cent. only. Even so, on a large installation, this may represent an appreciable sum. For example, to take an extreme case of low by-pass efficiency working on an average of eight hours a day at full load, increase in the by-pass efficiency from 50 to 70% reduced the effective cost per therm (*i.e.*, nominal cost $\times$ $\frac{100}{\text{overall boiler efficiency}}$) by 0·18d. per therm, or for a seasonal consumption of 10,000 therms, about £10 (gas at 6d. per therm). To meet such cases, automatic dampers of various types have been devised.

Prevention of Fire Dying Out.

A type of control which might be mentioned is a device to prevent solid-fuel fires dying out, when there is no demand for heat for a considerable period. This merely consists of a flue stat which opens the dampers or switches on the forced-draught motors, as the case may be, to supply further air and fuel, and the flue temperature is again raised, the flue temperature being so adjusted that sufficient fire is maintained to prevent any risk of dying out. The same object may also be attained by a suitably arranged time switch.

Operation of Coke Boilers Under Thermostatic Control.

In a system employing a separate boiler for central heating a good working value for the main flow temperature is arrived at by the following formula:

$$T_{flow} = 270 - 3T_a.$$

Where T_a is the outside temperature at 8 a.m.

However, with the dual system the main concern is to arrive at a flow temperature which will provide a good supply of domestic hot water from the calorifier, and the following adjustments were found to be necessary on a typical installation of this type.

To obviate the possibility of washing in running water at the lavatory basins the lowest tap temperature was set at about 120° F., which is higher than the normal hand can bear comfortably.

By a series of basin temperature readings plotted graphically for a gradually diminishing setting of the calorifier stat, the lowest advisable setting for the latter is obtained—it is usually in the region of 130° F. In a dual installation the setting of the boiler stat will have to be high enough to supply not only sufficient heat for the domestic water but a quantity over and above this for central-heating purposes.

The correct boiler stat setting is such that it will cause not overheating of the calorifier, but a regular operation of the calorifier stat, showing that the water temperature is oscillating slightly about the setting of the calorifier stat —being neither over- nor under-heated.

Determination of Correct Setting of Motorized Valves.

The control of the heat passing to the heating system is effected by adjusting the fractional opening of the main motorized valve when in its "closed" position, and by regulating the setting of the by-pass valve in relation to the open or closed position of the main valve.

It is necessary in these adjustments to keep a close watch upon the main boiler-flow temperature, the mixed flow temperature to the building, the by-pass temperature and the common return temperature from the building.

The chief difficulty in a dual system of this nature is to provide for the operation of the boiler in mild weather when very little heat is required in the building. The criterion for these conditions is to obtain the maximum difference between the main boiler-flow temperature and the mixed flow temperature.

The Position of Room Thermostats.

With reference to the position of room thermostats, it might be of interest to note that the usual position is about 5-6 ft. above floor level—*i.e.*, a little above head height. Some makers recommend that they should be fitted low down—*i.e.*, 2-4 ft. above floor level, to accommodate the normal mean level when the occupants are sitting. On the other hand, some makers suggest that high up—*i.e.*, about 12-18 in. below the ceiling—is better, the argument for this case being that the maximum rate of temperature change in the air occurs at this level; thus thermostats fitted here, although, of course, they will have to be set higher than the comfort temperature required at about 5 ft. above the floor, will answer more quickly to changes in temperature, and thus give closer control. This is supported indirectly by those who advocate the low position for the thermostat because they usually supply this type of thermostat fitted with a small electric heater attached to or round the bi-metal element which carries all or some of the current passing through the thermostat to the operating motor. This heater causes the thermostat to cut out sooner than it would otherwise do. The makers claim an anticipation of the demand or falling off in heat requirements when this type is used and fitted low down. On the other hand, it has been proved by experiment that a thermostat fitted with an auxiliary heater although giving a straight line control, does not maintain a fixed temperature, the temperature being in relation to that of the surrounding air. Thus, the colder the surrounding air, the lower the mean temperature maintained by the thermostat, and *vice versa*, due, of course, to the variation in the rate of heat loss by the thermostat element when the heat is shut off.

To assist those who have not sufficient experience in the selection and installation of such equipment there exists an organization, undertaking the supply and installation of thermostatic and similar controls, which is not committed to the marketing of any particular apparatus, and is consequently in a position to make an unbiased selection, and will, moreover, see that the installation is carried out in a manner calculated to give the most satisfactory results.

Maintenance Contracts.

In order to ensure that the best working conditions for controls of whatever type are maintained, maintenance contracts through the heating trade, through the company responsible for fitting the controls or, in the case of certain gas appliances, through the gas company, are strongly to be recommended. The cost is small, the client has the satisfaction of knowing that his control is kept in perfect working order, and the supplier has the satisfaction of knowing that his equipment is given an opportunity of doing itself justice and is not being abused in any way.

The foregoing Paper has attempted to give an insight into the contribution of the heating trade towards the introduction of what might be called "the automatic age." The public are slowly becoming "control minded." This is partly because semi-skilled labour is not nearly so plentiful as in past times, and partly because the standards of comfort have considerably increased.

Automatic clocks, automatic traffic regulation, automatic gear-changing, as well as the numerous labour-saving devices now available for the home, are all part of the present-day tendency towards economy of manual effort. Many a householder objects to the necessity of stoking his boiler or even winding his clocks before retiring for the night, and I think the heating trade can justifiably claim to have done its part in making automatic the heating services for the consumer who really studies convenience, economy, and operating efficiency.

Peeping into the future we can visualize the time when hot water and heating are automatically altered to a lower temperature at night, and return to a normal day temperature in the morning, and when incidental heaters are switched-on automatically when a person enters a room without even having to press a switch.

THE UNIVERSAL USE OF

Hot Water

by

T. SMITH

(Sales Manager to the Rochdale Gas Department)

From a Paper which was read before members of the Yorkshire Junior Gas Association at a meeting held at Leeds on Dec. 14, 1935, under the Presidency of Mr. J. W. Carlton, of Shipley.

Generally speaking, the demand for hot water is not well satisfied, due to the inadequacy of the domestic hot water apparatus. I am referring, of course, to the cylinder system such as is being fitted in domestic dwellings, fired with solid fuel only. The reason for failure of this type of apparatus may be due to one or more of the following causes:

(1) Storage capacity of cylinder too small.
(2) Time taken to recover the temperature of storage water too long.
(3) Fire going down due to inattention.
(4) Method of connecting up hot water circulation pipes not being designed to make small quantities of hot water available soon after lighting fire.

The ordinary residence with one bath should be provided with a 30-gallon storage cylinder. The storage cylinder should contain one hour's supply, and the boiler capacity should correspond to this duty—that is, the boiler should be able to transmit to the water 30,000 B.Th.U. per hour.

In residential flats the boiler capacity should be increased by 25%, and for hotels the boiler capacity increased by 50%. This margin will provide for sudden or unexpected demands and the extra water usually required night and morning by the residents and visitors. Generally speaking, while this standard is one at which it is desirable to aim, seldom are we confronted with a system in domestic premises which conforms to this standard. This must mean in many cases that, before a supplementary appliance can be introduced, an alteration has to be made to the existing apparatus.

The tank system has its storage situated at the top of the circulation and above the draw-off branches. The tank is, therefore, generally provided at the top of the house and in this position is less subject to high head pressures. A rectangular storage is generally adopted because it requires less space than a cylindrical vessel. Rectangular tanks are sometimes used in systems which are connected up on the cylinder principle. The only advantage of this system is that a secondary circuit is not necessary. Disadvantages, however, of an important nature, occur with the tank system. In the first place the primary circulation extends from the boiler to the storage, generally situated at the top of the house, but, unlike the secondary circuit, it must not be controlled by a night cock. Therefore, heat loss by radiation continues throughout the whole of this circuit as long as heat is applied. Secondly, it is impossible to draw water from the primary flow pipe from which all supplies are taken and to know definitely what proportion of the water is going down from the tank or up from the boiler.

This type of hot water system does not readily lend itself

to the introduction of an auxiliary gas water heater. Therefore, before anything is done where such a system exists, steps should be taken to modify the system to suit the type of heater to be installed.

As a general principle, when connecting up an auxiliary gas water heater to an existing system the position which the circulator should occupy should be as near as possible to the storage cylinder, but sufficiently below to allow the circulator to heat the whole contents of the storage cylinder. It may happen that at some periods of the day the demand for hot water is limited to a few gallons and that the times between the draw-off periods are lengthy. In this case the installation of a three-way valve, or what is sometimes called an economy valve, is desirable. With this device it is possible to limit the duty of the circulator to a smaller amount of hot water by varying the position of the return connection. The introduction of this device means that the apparatus is not wholly automatic, but I think it is fair to say that while storage heaters can be made absolutely automatic, it is true that storage systems in general call for a certain amount of care in order to ensure that hot water will be available at all times; alternatively, the work of the house must be regulated to the performance of the heater. This brings us to a very important point so far as gas water heating is concerned, when viewing this problem from a competitive standpoint —the ability of gaseous fuel to liberate large quantities of heat in a short space of time. This viewpoint suggests that the water heaters we recommend must have a sufficiently high gas rate. Wherever possible we should recommend an appliance which will do the work required in the shortest possible time. It may be said that the cost of installation and renewing services, meters, &c., make the introduction of quick recovery machines uneconomic. However, I am of the opinion that when the maximum gas supply to a dwelling house cannot exceed 150 cu.ft. per hour we are not likely to develop the use of our product to the fullest extent.

So far as the actual choice of apparatus is concerned, I think we should at all times try to install a self-contained piece of apparatus. By that I mean an appliance which embodies heating unit and storage cylinder. The gas heated circulator is, without doubt, in many ways a good appliance, and some manufacturers are developing the production of these machines on sound lines, including modern finishes; but however good those appliances may be in terms of efficiency, their maximum performance can only be achieved by good installation. We in the Gas Industry suffer in many instances from inefficient fixing. The self-contained storage heater at least solves the problem so far as the water connections are concerned, but the question of adequate gas supply remains. However, I think we are gradually educating the plumbers and fitters into the provision of proper gas supplies.

Instantaneous Water Heaters.

The type of instantaneous heater in which the gas supply is controlled by the flow of water through the machine is rapidly displacing the type of heater in which it is possible for external reasons to pass gas to the burner without water passing through the machine. Interlocking devices on non-pressure types of heater only serve to ensure that the water control valve must be turned on before the gas valve. It may, and often does, happen that an interference with the water supply will result in a temporary stoppage of the flow of water to the machine which in a very short time would lead to the melting down of the soft soldered seams in the heater interior. This can be avoided in non-pressure types by the introduction of a special type of valve. However, these machines are offered in large numbers without this fitting, and much damage must have been occasioned in the past, due to the reasons I have explained. On the other hand, the pressure controlled type of heater definitely ceases to function unless the amount of water passing through the machine is not less than the minimum amount of water required to operate the valve.

The application of this pressure controlled principle is, of course, applicable only to instantaneous heaters. However, the field for the instantaneous water heater would appear to be enormous, but before arranging for the installation of any type of pressure controlled apparatus care must be taken to ensure that the supply of water at the taps intended to be fed by the heater is sufficient to operate the valve. In many cases, especially in cottage property, the water services are joined—that is to say, blocks of houses varying from two up to, in many cases, twelve or even more houses, are fed with one lead service from the water main. In fact, it is sometimes found in property that ¾ in. supply has been installed to supply the needs of several householders. This state of affairs must inevitably mean that at times, when several people are requiring to draw off water, that the supply is insufficient to allow a geyser of the pressure type to operate, or, alternatively, with a geyser of the non-pressure type, to allow the gas to go on burning without water passing through the machine unless a safety valve has been fitted. There is no doubt that the occurrence of trouble of this nature does seriously affect the chances of installing gas water heaters of the instantaneous type, and unless steps are taken to rectify the deficiency by the installation of a suitable service of the correct size, it would appear that a small storage sink heater is the only appliance to fill the need. Another point with instantaneous heaters of the multi-point class which must be given consideration is the size of pipe leading to the draw-off points. In many cases, where the installation of a multi-point heater is considered, the person responsible for the installation must satisfy himself that sufficient water is available at the highest draw-off tap, and where exceptional long runs of pipe are concerned, the size of pipe to be used should be given consideration and increased accordingly.

Selection of Gas Water Heaters.

The selection of a gas water heater for a particular purpose must obviously be governed by the individual considerations of the consumer and the requirements to be met. Great care should be taken to enquire the possible uses of the gas water heater before deciding on the actual type to recommend. It is often discovered, as a result of a complaint from a consumer, that the gas water heater recommended and installed was in no way able to serve the purpose intended.

The advantages of the geyser are that water is raised to high temperature instantaneously and the appliance can be utilized for the production of small or large quantities of water as required, the rate of flow and temperature of water being proportional to the gas rate of the heater. On the other hand, the comparatively high gas rate of this type of appliance demands a gas supply of a sufficiently large diameter to deliver the amount of gas required, also a meter of sufficiently large capacity must be installed to ensure that, when the geyser is in use, any interference with other appliances will not take place. Adequate ventilation must be provided; also, with certain types of geysers, special precautions must be taken to drain off the condensation which collects at the base of the geyser.

The low-consumption storage type of gas water heater may be obtained in capacities varying from 1½ gallons upward, the gas rate of this type of heater ranging from 10 cu.ft. per hour to about 20 cu.ft. per hour. The advantage of this heater is in its low rate of gas consumption, which means that a gas supply can be taken from almost any convenient gas point without a great deal of trouble. The supply of hot water is definitely limited, and the demand for the water from this type of heater must be planned ahead.

High consumption storage heaters with a gas rate of from 50 cu.ft. per hour upwards give a quick recovery of heat in the water and are really a compromise between the geyser and the low consumption storage heater. Adequate ventilation via flues is necessary with this type of heater, and this feature itself, in some cases, precludes the introduction of this type, due to the available position being one from which a flue could not be easily taken.

Installation of Gas Water Heaters.

The actual fixing of gas water heaters is by this time recognized as the job of a specialist. Very often the whole appearance of a gas water heater can be spoilt by indifferent fixing and the utility of the heater seriously impaired by incorrect adjustments. So far as the gas supply is concerned, the actual size of the connection on the heater itself is no indication of the size of gas supply which should be run from the meter to the heater. The only basis from which the size of the gas supply can be determined is the gas rate of the heater. Having obtained the gas rate, I recommend the use of the tables such as are to be found in the Gas Salesman's Pocket Book, relating to the size of pipes and length of run for different deliveries. The tables to which I am referring may be regarded by some as very critical and perhaps a little too exacting, but I submit that, if the provisions set down in these tables were adhered to, many of our troubles in this direction would disappear. I do not intend to discuss gas fitting practice in this Paper except to state that the standard of gas fitting had undoubtedly improved in recent years within gas undertakings, but unfortunately there is still a lamentable lack of knowledge among architects and plumbers regarding the equipment for gas fired boilers.

The considerations regarding the supplies of water to gas water heaters are again, so far as size is concerned, governed by the rate of flow required at the heater. The

actual strength of materials used is a matter in which the local water authorities are interested, and it is necessary to conform to their standard when fixing appliances within their area. When fixing water supplies to circulating boilers, great care should be taken as to the size of the circulating pipes. Pipes of a less diameter than ¾ in. are never to be used as circulators; the restriction to the flow offered by pipes of a lesser diameter is sufficient to hamper the circulator in its work. Again, in connection with storage systems, the cold water storage tank should be of an equal storage capacity to the contents of the cylinder. This will enable the consumer to draw-off the whole contents of the cylinder even though the rate of the flow from the cold water service into the storage tank is not equal to the delivery at the draw-off taps.

All pipes which take part in the circulation of water heated by a gas fired unit should be suitably lagged. The cost of running a gas heated circulator on to a system which is unlagged can very easily account for as high a gas consumption due to the heat losses by radiation as the gas consumption for the actual work performed. Lagging is available in many proprietary forms, usually in sections six inches wide and in a variety of lengths. One pipe of insulating material with which I have come into contact consists of hairfelt ½ in. thick cemented to a waterproof fabric and is used for attachment to pipes in close proximity to walls. The sections are made in 3 ft. lengths and in two widths—namely, 2 in. for pipes up to ¾ in. diameter and 4 in. for larger pipes. For attachment to pipes away from walls it is supplied in strips 8 yds. long and in two widths as above for wrapping spirally round the pipes.

Discussion.

Mr. L. GIBSON (Birkenhead) said that probably one of the biggest difficulties to be faced in the installation of water heating apparatus was the lack of any control of the water supply by most gas undertakings. The question as to the relative values of storage heaters and instantaneous heaters was, of course, familiar and would doubtless remain controversial. The Industry might be wise in retaining both. The tendency of to-day, however, seemed to the speaker to be in the direction of the instantaneous type, especially as these gave an instant service such as could not be given by the competitors of gas.

A MEMBER said he favoured the multi-point or instantaneous type. This was a time of speed in most things, and the instant service of hot water on tap was a very strong selling factor. In some cases, it must be agreed, the problem of the flue was an awkward one, but it had to be got over, and the speaker's view was that salesmen would be well rewarded by recommending the instantaneous heater wherever possible. Another point, not mentioned by Mr. Smith, was that, as these installations were always on view, it was essential they should be well fitted, with no unsightly fixtures, and chromium-plated fittings should be encouraged.

Another MEMBER agreed with Mr. Smith that, while instantaneous heaters had the big advantage of quick recovery, there were many cases in which this type of installation could not meet the need, and therefore storage heaters were still good.

Mr. J. R. FIRTH (Bradford) said although Mr. Smith had mentioned fitting, he had not gone into detail as to cost of this job, and it would be interesting if he could give any figures as to cost of fitting work.

A MEMBER remarked that the multi-point heater had the advantage of an external safety by-pass which prevented blow-out of the flame.

Mr. J. HUBBARD (Leeds) emphasized the desirability of finding means of increasing the summer gas load, and regarded the storage type of water heater as one of the best means to this end.

Mr. E. R. B. FRENCH (Leeds) said the matter of soft and hard water was a point of some importance, because in some areas the nature of the water created difficulties which did not obtain everywhere. In Leeds, for instance, with a soft water supply it was essential they should use copper appliances for water heating, which, of course, increased the cost. In very large appliances they had been able to make an exception by adapting the inner cylinder of an indirect type to introduce a boiler of iron material.

The PRESIDENT (Mr. J. W. Carlton) said his own preference was for the instantaneous heater as against the storage type, if only because one could not waste gas in the instantaneous type unless one deliberately ran water to waste. The difficulty of getting adequate water pressure to enable a gas water heater to function to full capacity was, undoubtedly, one of the big problems which they had to face. They were fortunate who were in the service of an undertaking which combined the control of both gas and water.

The Author's Reply.

Mr. SMITH, replying to the discussion, agreed that the matter of water control was one of their biggest problems. These waterworks restrictions seemed to go back so long that nobody now appeared to know just why they were created. The Metropolitan Water Board had gone into the matter lately, and wider notice was being taken of the recent decision of the Metropolitan Water Board and he (Mr. Smith) believed the position in regard to water pressures was likely to be eased somewhat in the not very distant future. On the question of instantaneous *versus* storage heaters, Mr. Smith did not consider the two were really competitive, but rather as being each more suitable than the other in certain circumstances. While he did not particularly like heaters with a low gas rate, these heaters were unquestionably desirable and very valuable in some places, and what the gas people had to do was to see that the job secured a heater which would meet its particular conditions of gas supply, water supply, and other local circumstances.

In reply to Mr. Firth's question about cost of fixing, that was a very variable factor according to circumstances. It was a matter on which one could hardly give any sort of figure for general purposes.

Mr. S. DAVIES (Sheffield) proposed a vote of thanks to Mr. Smith, and this was seconded by Mr. J. R. FIRTH (Bradford).

Paying Propositions

Some useful suggestions were put forward with a view to creating greater customer satisfaction by the Author in the course of a Paper which he read before a Meeting of the Midland Junior Gas Association on Jan. 16.

by B. GREEN,
of Stourbridge

The day of drudgery by the housewife is fast disappearing, and I think it will pay us to replace black cookers with enamel ones as speedily as we can. The servant problem is giving the Gas Industry a chance to show the housewife what it can do in the provision of a better type of cooker. I do not mean better in efficiency, though this may be possible, but better in appearance. Gas undertakings must make it possible for every consumer to possess an all-enamel cooker.

In suggesting this as a paying proposition, may I throw out a hint that time may be spent in devising a means of doing away with the ugly grease-collecting top bars of the present-day gas cooker? Surely such a thing is not outside the region of accomplishment?

Reconditioning black cookers and offering them on favourable hire-purchase terms in their smart enamel appearance is one way of meeting the demand for colour. It is, however, imperative that we should have a cheaper type of cooker put on the market to meet the ever-increasing demand for labour-saving cookers in the home. If the domestic cooking field is to be held we shall have to see that the artisan householder is able to secure a comparatively modern type of cooker at a price within his means. Again, I think it would pay to have maintenance men to attend regularly to the burners and general appearance of cookers. A large amount is spent on the repair and maintenance of cookers at the works, and although it is a matter for conjecture I think it would save transport and unnecessary dismantling of cookers if regular visits were paid by capable men to see that every cooker, whether on simple-hire or other terms, was functioning correctly. We also need a more silent type of burner on the hotplate. With the advent of the silent burner on the gas fire, surely it is possible to reduce noise to a minimum on the cooker.

Refrigeration.

The gas refrigerator is a paying proposition. We are told on good authority that the consumption of one of these refrigerators, spread over a period of time, is equivalent to half a cooker. None of us would doubt the value

of the cooking load, so we may conclude that vast possibilities of successful sales of gas lie in the realm of refrigeration. This is a comparatively new field for gas, and with propaganda and enthusiastic selling it should be quite easy for us to claim refrigeration as an essential avenue of gas sales.

Lighting.

The lighting load is rather a controversial subject. Even some in the Gas Industry are of the opinion that we ought to let this go, and concentrate our energies on other spheres of activity which are likely to be more profitable. I suggest, however, that it is a mistake for us to allow it to be said that any other form of illuminant is better than gas. We should believe in our product in this respect, and while our chief competitor may possess advantages yet if carefully studied it will be found worth while to concentrate more on gas as a lighting agent. What we need to emphasize more is that attention be paid to a better, simpler, and more silent type of burner. We also need an unbreakable kind of glass for globes of a decorative character. I would further suggest that a fortune awaits the man who can invent something to prevent the dirty ceiling where gas lighting is used. Along these lines we could retain a lot of the lighting load and recapture some of that lost. I observe that in some areas where the question is being enthusiastically tackled, marvellous results are obtained; in fact, one undertaking is getting two houses lighted by gas to every one lighted by electricity.

Calor Gas or Bottled Gas.

Changing conditions demand changed methods. What would electricity supply undertakings do if they had the opportunity of assisting the rural dweller to a supply as easily as we can with "Calor Gas" or bottled gas. I fancy they would go all out to gather all the business they could from it. This way of giving a gas supply is not the ideal way, but it is helpful in that it prepares the consumer for the eventual coming of the mains, and with his house already piped he is going to think twice before he changes over to another form of lighting and heating service.

Heating.

In the kitchen we have the cooking load, but it is seldom that we get a gas fire fitted as well, and a paying proposition here would be a combination cooker and fire. Running costs would have to be considered very carefully, and it might be suggested that some kind of preferential rate for gas used in the kitchen be introduced. We need to proclaim the idea as much as possible from a labour-saving point of view, for many hours must be wasted in a day in the chopping of wood, carrying coal, and laying and replenishing fires in the kitchen. A gas fire would probably save money in the long run, because on many a day a coal fire is made where it is not necessary, and a gas fire has the advantage of being used intermittently.

It would be well worth the effort to capture the night bread-baking load, and so increase the output at a time when the call on the mains is not very great. There are also other night services which if supplied by gas would considerably help up the annual consumption.

Showrooms and Demonstrations.

It is a most essential adjunct to the showroom to have a demonstration or lecture room which could be used for cookery demonstrations, washing demonstrations with modern washers, and for showing the public how to operate certain types of apparatus. Further, it would pay a gas undertaking possessing such a room to let it out free of charge or with a slight charge for heating, &c., to various organizations which are not directly interested in gas propaganda but which exert a very powerful influence among the consumers. I refer to the hundred-and-one types of women's organizations that are springing up in our towns and cities. And why not men's organizations too? Much can be done to demonstrate gas lighting in such a room.

Contact with Traders Allied with the Gas Industry.

Many channels are open to us to increase our trade if we are alert to our opportunities, and I must not omit from this Paper the value of contact with traders allied to our Industry. Here, perhaps, I am speaking more of the domestic field, although I can quite see the same idea being worked out with profit with industrial selling. It seems to me that furnishers can assist us as well as ironmongers, and we ought to seek the goodwill and friendly relationship of these traders. It goes without saying, too, that with the hardware merchants and builders we should offer terms which will literally compel them to think of us when housing schemes are being considered. We must also for ever be making approaches with our ideas to architects so that they, too, in the preparation of plans, shall not leave out the consideration of gas apparatus of some kind.

Education.

One very important paying proposition we must not overlook if our Industry is to be safeguarded for the future is our attitude to youth in the schools of to-day. In a few years' time, girls and boys now practising at our domestic science centres and school laboratories will be home-makers and works' managers and will be the people to decide what shall be the form of heating and lighting in domestic and industrial life. We must see to it that provision is made in the cookery centres of our elementary and secondary schools for girls to learn the art of cooking, washing, ironing, &c., by means of gas apparatus, and do not let us be content to give them second-rate types of apparatus. Let them practise on the very latest and best we can give them. The coming generation must know that there is no inferiority complex gathering around gas because it is old. The schools are the places where it is possible for us to get in the early seed for the establishment of gas business of the future days, and I suggest it will pay a thousand times for us to assist the schools to gain all the knowledge possible of gas and gas apparatus.

It is definitely a paying proposition to keep on friendly terms with women's organizations. Along this way is the real road to success for a great amount of gas selling. It is a very valuable thing to get the womenfolk interested in gas apparatus, and the gas undertaking should see to it that every facility is granted to the various educational groups, literary societies, social welfare institutes, townswomen's guilds, and women's institutes. If it is a case of demonstrations and lectures let us never rest until the Gas Department has a place on the quarterly or half-yearly programme of these organizations. Be it remembered that at least 70% of our consumers in the domestic sphere are women, and wherever there is an audience of women we must be ready with someone to tell the story of gas and its wonder-working ways.

On one or two occasions it has been my privilege to give talks in our district on gas distribution, and in the resulting discussions that have taken place I have been amazed at the apparent lack of knowledge of our average audience as to what gas can do, and the almost entire absence of knowledge of the different types of apparatus which undertakings have for disposal. I feel that it is in these inner personal contacts with consumers in their small groups, especially with women's organizations, that the real business-getting propaganda lies.

Another aspect of this section of my subject is that I do not think time is wasted if the staff of the gas undertaking become members of the various political, social, or religious organizations in the city or town where your gas is supplied. This may seem a rather indirect way of doing things, but it pays to develop the friendly spirit with all and sundry who are likely to want to use gas. True, it may be that your staff will probably be challenged again and again as to the relative merits of gas and other heating and lighting agencies, but what does this matter as long as someone is at hand when anything of this nature is likely to arise.

One of the leaders of our Industry recently stated, "Research is more important to an old industry than to a new one." An old-time industry is generally very faithful to tradition. The signs of the times, however, demand watchfulness and alertness. There was a time when it may not have been necessary to indulge in a great amount of intensive research work, but to-day the situation is very different.

Discussion.

The PRESIDENT (Mr. F. L. Atkin) said that one of the points he liked in the Paper was that referring to the hiring of a demonstration room to social organizations. It was a new idea to him, but he thought it was worthy of attention, because if, as Mr. Green suggested, women's organizations and similar social clubs had a room that was warm and well lighted, the subtle influence of gas would have an effect upon their reactions towards the use of gas. A properly carried-out census of apparatus would give a valuable inside knowledge of the habits of the people. They had, as an industry, far more intimate contact with the people than, say, a motor manufacturer. He thought that cheaper fittings and apparatus were rather a mixed blessing. He did not think that all apparatus should be cheap, and was of opinion that if they offered the consumer something he wanted which was really good, he would not turn it down for the sake of a few shillings.

Mr. F. A. JENKINS (Leamington), in proposing a vote of thanks, said he was afraid that in some places gas lighting was

regarded as rather "a hopeless case," but he did not regard it as such, and felt that if such a view were taken generally it was the fault of the Gas Industry. The speculative builder seemed to have it fixed in his mind that unless he installed electric light he could not sell his houses, and it was up to the Gas Industry to do everything possible to get this idea removed. He thought that a properly carried out census would be the means of obtaining new business, although it would mean considerable expense in clerical labour and organization. With regard to research he pointed out that, apart from the larger undertakings, this had been left mainly to the appliance manufacturers. This was a mistake, and while at a smaller works it might not be possible to produce much of great value, the effort to obtain information at first hand should be worth while.

Mr. F. A. C. PYKETT (Coventry), in seconding the vote of thanks, said it could be seen from the very energetic way in which the Author had dealt with the various aspects of his subject that he was not at peace with the world so far as the Gas Industry was concerned.

Mr. J. D. WINDMILL (Birmingham), asked if the Author thought it would pay to give free maintenance service to all apparatus, even if it meant slightly increasing the price of gas.

Mr. W. N. SMIRLES (Birmingham), referring to the title of the Paper, asked what was "a paying proposition." A piece of apparatus was a form of propaganda, and for that reason he was apt to look askance at schemes which tended to reduce too far the price of apparatus. Cheap and inefficient apparatus could have a very bad effect upon a prospective customer. The supply of gas and other forms of fuel was bound up with the standard of living which regulated the amount of money a person had to spend on luxury articles. With this in view, it was far more important to endeavour to appeal to the masses of the people than to a selected few who could afford to purchase high-priced apparatus, such as refrigerators. He thought the use of a refrigerator was largely bound up with climate, and in certain countries refrigerators had become extremely valuable from a gas utilization point of view. In this country, however, it was not such a vital consideration. He felt that the Industry should not pay too much attention to the selling of such apparatus when there remained so much to be done in the modernizing of other forms of gas equipment in the home. More attention was being paid to the provision of hot water in even moderate homes, and it was to this class of home that effort should be mainly directed. On the question of heat in the kitchen, he pointed out that combined cookers, gas fires, and boilers had been placed on the market, which should solve the question raised by the Author. He thought the Author had missed rather an important point in not referring to automatic lighting and control of gas appliances, which was much to the fore nowadays.

Gas for Schools.

Mr. S. BROCKBANK (Walsall) said he was particularly interested in the question of bringing gas to the notice of children in schools. In Walsall the schools had been fitted up with demonstration rooms with notable success. Many of these rooms were fitted with very large cookers, but he thought possibly it would be wiser to install a number of smaller cookers such as would be used in the home. The education authorities encouraged visits of school children to the Works, and the number of children attending had increased; whereas a few years ago they had come in parties of 20, now they came 80 to 120 strong. These visits entailed a large amount of work, but he thought it was a good form of propaganda.

Mr. K. L. PEARCE (Bilston) referred to the Author's suggestion that all black cookers should be replaced with enamelled ones, but said that he did not say how this was to be done. The capital outlay involved was very large. They had introduced such a scheme at Bilston, but it was doubtful if it could be called a paying proposition. They had also introduced a census and had a very good card index system from which could be seen at a glance the type of apparatus in each house. In carrying out the census they had obtained many sales; in fact, he estimated that an order for apparatus had been received from every fifth or sixth house at which a call had been made. Referring to the visits of school children to the Gas-Works, he thought that visits should be confined to children just about to leave school, as at that age they took more interest. In addition to the visits to the Works, they showed B.C.G.A. propaganda films to both the children and parents.

Mr. A. W. ATTWOOD (Coventry) said that he thought all maintenance men should be capable of advising consumers on the state of the various apparatus on their premises. A dissatisfied customer was an easy prey to competitors. He thought that panel heaters were the best form of heating to be introduced where there were no means of taking away the products of combustion.

Mr. F. J. BENGOUGH (Birmingham) said he had hoped to hear some reference made to the use of coke heating as a paying proposition. Peak loads were very dear from a gas-making point of view, and he felt that if more coke fires were installed it would help the gas maker in times of peak loads, and if such peak loads could be levelled out, it would help to cheapen gas.

Mr. G. E. BURDEN (Redditch) referred to Mr. Green's suggestion that black cookers should be replaced with enamelled ones as quickly as possible. They would all like this, but he could not see how it could be done. Most black cookers were on simple-hire terms, and to replace them with enamelled ones was rather a risky business. As far as he could see the black cookers could not be reconditioned, as many of them were not modern, and in his opinion the cost would be prohibitive. As something between black and an enamelled cooker, they had spray-painted cookers. At the moment these were standing up very well, but it would be some time before they could say whether it was a worth while proposition. In his opinion, all-electric wireless sets had contributed largely to the loss of lighting loads. He thought there was a good outlet for gas in the heating of retail shops.

Mr. F. A. C. PYKETT (Coventry) referred to the question of enamelled cookers, and said they had done a lot of business in this respect in Coventry, and in the last two years had sent out 20,000, half of which were old black reconditioned cookers. The cost of doing this was slightly less than £2 5s. each. Previously, they had been put out free or on hire at 1s. 6d. per quarter. Where they had been supplied free, the enamelled ones were hired at 2s. per quarter and the others at 3s. per quarter. The rent from these reconditioned and enamelled cookers, during, say, the next three years, would go a long way towards the cost of cookers purchased during that period. If the price of gas could be made cheaper then he thought people would be willing to pay a little more for their apparatus. In his opinion, gas refrigeration was too costly. He thought the Industry should develop the sale of coke grates which, in this country, were a far better selling proposition than refrigerators, about which he was very sceptical. They had a free maintenance scheme for house lighting in Coventry, but in spite of this they were losing lighting consumers. In his opinion, if a self-illuminating mantle had been invented a few years ago it would have been the salvation of gas lighting. Commenting on the question of a census of gas apparatus, he said that at one halfpenny per 1,000 cu.ft., it would cost Coventry £5,000 to put in such a scheme, which, of course, was prohibitive. In Coventry they had supplied cookers free to domestic centres in schools for some time past, but the electricity people were now doing the same thing, and one now saw gas and electric cookers side by side in these domestic classes.

The Author's Reply.

In replying to the discussion, Mr. GREEN said he did not think that the free maintenance of all apparatus would be a paying proposition as it would increase the price of gas. His point in regard to cheap apparatus was that there was greater scope for sales to the artisan consumer. In the past it had been thought that simple-hire was good enough for that type of consumer, but they now required something similar to the £10 cooker only in a cheaper type. He thought the aim should be to sell both gas and apparatus as cheaply as possible, consistent with efficiency. He was not a great believer in simple-hire but favoured cash or hire-purchase terms. In advocating cheaper fittings, these should not be of a less efficient type, but in his opinion most of the fittings on view in various gas showrooms were only obtainable by the more wealthy consumer. The lower classes were not sufficiently catered for. There were a lot of people who could not buy because things were too dear, and if gas consumption were to be obtained then apparatus must be less costly. He did not agree that refrigeration was bound up with climate. Even at Christmastime it was good to be able to put food into a refrigerator. In his opinion, refrigeration had come to stay in this country. He could not see that switch lighting such as was provided at present was a paying proposition, and he thought there was need for the development of a better switch and a better burner in order to get the lighting load. With reference to the comments regarding the change over to enamelled cookers, he was of opinion that this could be done; but, of course, it had to be carried out very gradually.

The Women's Gas Council

Visit to the British Industries Fair.

The President and Council of the Birmingham Chamber of Commerce have invited the Birmingham Branch of the Women's Gas Council to tea at the British Industries Fair, Birmingham, on Thursday, Feb. 27, at 4 p.m.

Prior to tea there will be an informal reception after members have been conducted round the Gas Section.

Southend.

On Account of the King's Funeral, the Women's Gas Council meeting arranged to be held in Southend on Jan. 28 has been postponed until Feb. 18.

Altrincham.

The Inaugural Meeting of the Altrincham Branch of the Women's Gas Council will be held at Cross Street, Altrincham, on Feb. 6.

Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

The great national bereavement of last week naturally overshadowed Stock Exchange affairs, but such is the belief in the country's financial position and its future under the new King that towards the close the former activity was resumed and there were several good features. Gilt-edged stocks strengthened, and Home Rails received a fillip on the result of the Southern Railway's rating appeal, while business in industrials was on a large scale. Among the more speculative issues, rubbers were stimulated on the further rise in the price of the commodity and prices quickly responded.

Gas stocks and shares also participated in the general improvement which came about at the end of the week, and with the renewed demand a number of quotations were marked up in value. In the London list the latest revival of interest in South American industrials led to a sharp rise of 10 points in Montevideo stock to 60½, and enquiries for Plymouth and Stonehouse put the quotation 3 points higher at 164½. South Suburban ordinary went further ahead with another rise of 2 points, closing at 134½, and Croydon maximum dividend stock hardened a like amount to 117½. Among debentures, a parcel of Metropolitan (of Melbourne) 5½% came into the market and took the price up 4 points, while Tottenham 4% gained 3 to 105½. The only reaction occurred in Imperial Continental ordinary with a drop of 2 to 185½. In the Provincial lists, Sheffield consolidated gained 1½ points to 144, and among Supplementary quotations Guildford consolidated was marked up 5 to 177½.

The three Metropolitan Companies have announced their final ordinary dividends for the past year which are as follows: Gas Light and Coke Company, £2 16s.%, making £5 12s. for the year (the same); South Metropolitan Gas Company, 3½%, making 5¾% for the year (the same); and the Commercial Gas Company, 2½%, making 5% for the year (against 5½% for 1934).

The Wandsworth and District Gas Company is maintaining the final dividend at 3½% on the consolidated stock, making 7% for the year.

Current Sales of Gas Products

The London Market for Tar Products.

Jan. 27.

Prices of tar products remain as quoted on the 20th inst.—namely:

Pitch, 43s. to 45s. per ton f.o.b.

Creosote, about 5½d. per gallon.

Refined tar, 4d. per gallon in bulk at makers' works.

Pure toluole, 2s. 9d. to 2s. 10d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, 1s. 8d. to 1s. 9d.; and 90/160 pyridine about 4s. 9d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Jan. 27.

The average prices of gas-works products during the week were: Gas-works tar, 23s. 9d. to 28s. 9d. Pitch—East Coast, 42s. 6d. to 45s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 42s. 6d. to 45s.* Toluole, naked, North, 2s. 2d. to 2s. 4d. Coal-tar crude naphtha, in bulk, North, 7¾d. to 8d. Solvent naphtha, naked, North, 1s. 6d. to 1s. 6½d. Heavy naphtha, North, 1s. to 1s. 1d. Creosote, *ex* works, in bulk, North, liquid and salty, 4⅝d. to 4⅞d.; low gravity, 4⅜d. to 4⅝d.; Scotland, 4⅜d. to 4⅞d. Heavy oils, in bulk, North, 4⅜d. to 5d. Carbolic acid 60's, 2s. 4d. to 2s. 6d. Naphthalene, £18 to £20. Salts, 90s. to 95s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Jan.* 25.

While enquiries are quite numerous there is not much business behind them although, on the other hand, stocks being comparatively low, prices remain steady.

Crude gas-works tar.—The actual value is 30s. to 31s. per ton *ex* works in bulk.

Pitch.—Value of vertical grade is round 35s. to 37s. 6d. per ton f.o.b. Glasgow for export and 35s. per ton *ex* works in bulk for home trade, but little business is passing.

Refined tar is on offer at 2¾d. to 3d. per gallon naked at makers' works, according to quantity.

Creosote oil.—There is, if anything, a slight diminution in turnover. Quotations, however, remain unchanged. B.E.S.A. Specification, 5¼d. to 5½d. per gallon; low gravity, 5⅜d. to 5⅝d. per gallon; and neutral oil, 5⅜d. to 5⅝d. per gallon; all f.o.r. in bulk.

Cresylic acid.—Demand is less active and business has been conducted during the week at the following prices: Pale, 97/99%, 1s. 5d. to 1s. 5½d. per gallon; dark, 97/99%, 1s. 3d. to 1s. 3½d. per gallon; and pale, 99/100%, 1s. 5d. to 1s. 6d. per gallon; all *ex* works naked.

Crude naphtha is only available in small quantities at 5¼d. to 5¾d. per gallon, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 4½d. to 1s. 5½d. per gallon, and 90/190 heavy naphtha is 1s. to 1s. 1d. per gallon.

Motor benzole.—Available supplies command 1s. 3½d. to 1s. 4d. per gallon in bulk at makers' works.

Pyridines.—90/160 grade is 4s. 6d. to 5s. per gallon, and 90/140 grade 5s. to 5s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.			
Crude benzole	0	9½	to	0	10	per gallon at works		
Motor "	1	3	"	1	3½	"	"	"
90% "	1	4	"	1	4½	"	"	"
Pure "	1	7½	"	1	8	"	"	"

Contracts Advertised To-Day

Carbonizing Plant.
Plymouth Gas Department. [p. 272.]

Mantles.
Hereford Gas Department. [p. 272.]

Meters.
Dewsbury Gas Department. [p. 272.]
Hereford Gas Department. [p. 272.]

Pipes and Specials, &c.
Dewsbury Gas Department. [p. 272.]
Hereford Gas Department. [p. 272.]
Spenborough Gas Department. [p. 272.]

Retorts.
Cowes Gas Department. [p. 272.]
Dewsbury Gas Department. [p. 272.]
Haverhill Gas Department. [p. 272.]

Stores (Oils, Sulphuric Acid, &c.).
Hereford Gas Department. [p. 272.]

Tar.
Slough Gas and Coke Company. [p. 272.]

Wash Coppers.
Hereford Gas Department. [p. 272.]

Water Gas Plant.
Cowes Gas Department. [p. 272.]

Weighbridge.
Cockermouth Gas Department. [p. 272.]

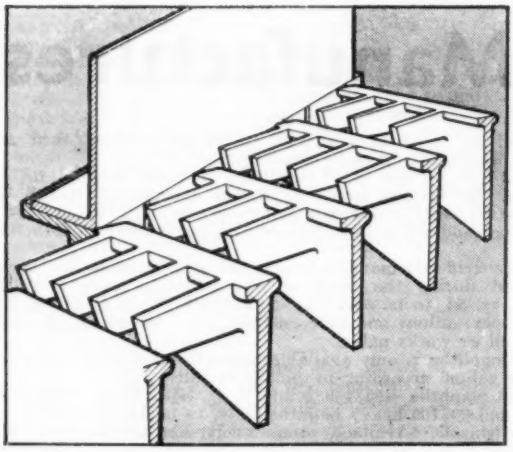
Trade Notes

Clubs Install "Guesthouse" Gas Ranges.

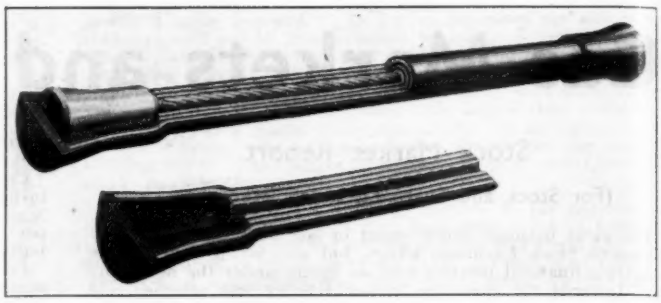
The following important clubs have recently installed "Guesthouse" gas ranges: Royal Epping Forest Golf Club, Japanese Club, Welcome Club, Park Royal Stadium Club, and Hangar Hill Garden Club.

Handling and Conveying Plant.

From the Hepburn Conveyor Company, Ltd., of Rosa Works, Wakefield, we have received copies of their latest leaflets descriptive of the firm's handling and conveying plant, including various types of portable conveyors, stacking machines, and electric pulley blocks for both travelling and stationary work. Much of this equipment will find useful application on the gas-works for one purpose or another.



The grading racks keep clean because they are left free to move relative to each other and to the tray.



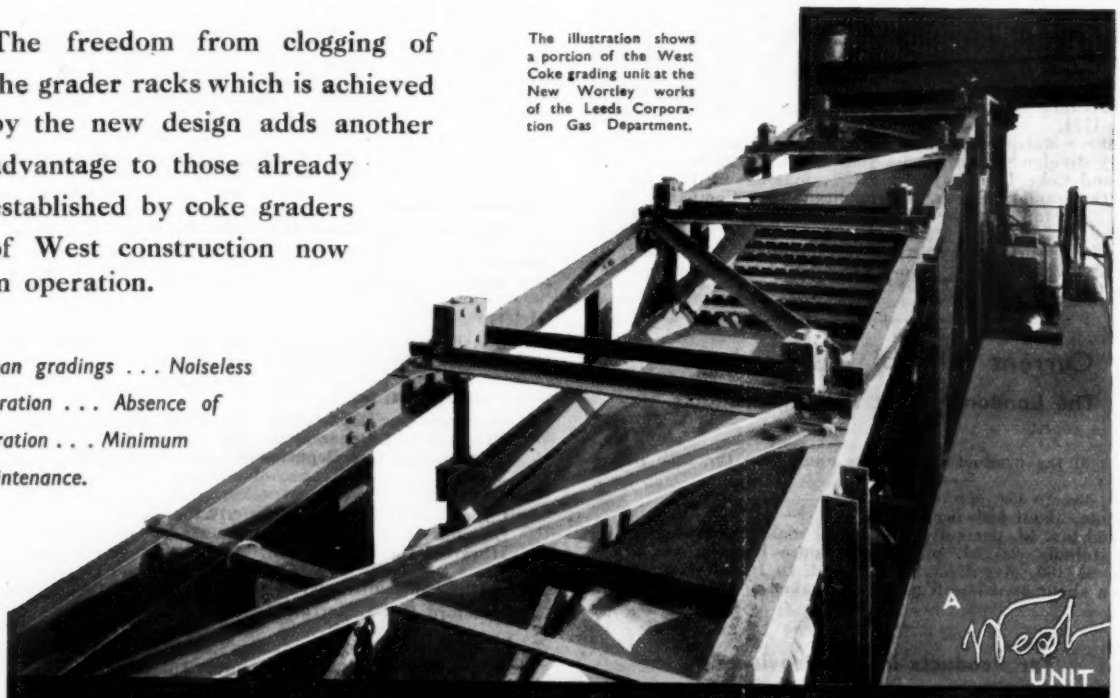
The improved flexible suspension members are made with a core of plough-steel extra-flexible wire rope set in a mould of alternative layers of vulcanized rubber and rubber-impregnated canvas, all made true to length and size.

A Further Advance in Coke Grading Practice . . .

The freedom from clogging of the grader racks which is achieved by the new design adds another advantage to those already established by coke graders of West construction now in operation.

Clean gradings . . . Noiseless operation . . . Absence of vibration . . . Minimum maintenance.

The illustration shows a portion of the West Coke grading unit at the New Wortley works of the Leeds Corporation Gas Department.



THE *West* COKE GRADER

. . . Modern methods to meet modern demands . . .

THE WEST SYSTEMS

OF COAL AND COKE HANDLING AND PREPARATION

WEST'S GAS IMPROVEMENT COMPANY, LTD.

MANCHESTER : ALBION IRONWORKS, MILES PLATTING — 'Phone: COLLYHURST 2961 : 'Grams: "STOKER, MANCHESTER"

LONDON : COLUMBIA HOUSE, ALDWYCH, W.C.2 — 'Phone: HOLBORN 4108 : 'Grams: "WESGASCO, ESTRAND, LONDON"

MEMBERS OF THE SOCIETY OF BRITISH GAS INDUSTRIES.

STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Jan. 24.	Rise or Fall on Week	Transactions, Lowest and Highest Prices During the Week.
1,551,868	Stk.	Sept. 9	7	7	Alliance & Dublin Ord. ...	135—145	...	143—148⅝
374,000	,,	Dec. 16	4	4	Do. 4 p.c. Deb.	95—100	...	...
557,655	,,	Aug. 12	7	7	Barnet Ord. 7 p.c.	165—170	...	...
300,000	1	Oct. 7	1 9/16	1 14/16	Bombay, Ltd.	1 3/16—1 5/16	...	...
178,480	Stk.	Aug. 12	9½	9½	Bournemouth sliding scale ...	222—232	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	171—176	...	174½—176
489,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	150—155	...	...
50,000	,,	Dec. 16	3	3	Do. 3 p.c. Deb. ...	82—87	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
357,900	,,	Aug. 12	7½	7½	Brighton, &c., 6 p.c. Con. ...	170—175	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	156—161	...	...
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	142—147	...	...
855,000	,,	Sept. 23	8	7	British Ord.	152—157	...	...
100,000	,,	Dec. 16	7	7	Do. 7 p.c. Pref.	153—158	...	155½
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...	114½
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	96—101	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	107—112	...	...
200,000	,,	,,	17/6⅝	3½	Do. 3½ p.c. Red. Deb. ...	98—100	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	...
150,000	Stk.	Jan. 6	4½	4½	Do. 4½ p.c. Deb. ...	81—86	...	...
626,860	,,	July 22	6	6	Cardiff Con. Ord.	133—138	...	...
98,936	1	Sept. 23	2/-	2 -	Colombo, Ltd., Ord.... ...	1⅜—1½	...	...
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	20/—22/-	...	...
609,204	1	Oct. 7	-/11·48	- 11·48	Colonial Gas Assn. Ltd. Ord.	19/6—21/6	...	...
296,053	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	24/6—26/6	...	...
1,775,005	Stk.	Aug. 12	6	5	Commercial Ord.	100—105	...	104
620,000	,,	Dec. 2	3	3	Do. 3 p.c. Deb. ...	85—90	...	...
286,344	,,	Aug. 12	5	5	Do. 5 p.c. Deb. ...	121—126	...	125½
807,560	,,	Aug. 12	7	7	Croydon sliding scale ...	151—156	...	...
569,590	,,	,,	5	5	Do. max. div.	115—120	+2	117
620,385	,,	Dec. 16	5	5	Do. 5 p.c. Deb.... ...	121—126	...	...
239,000	,,	Aug. 12	5	5	East Hull Ord. 5 p.c.... ...	109—112	...	...
181,625	,,	Aug. 12	6	6	East Surrey Ord. 5 p.c. ...	132—137	...	...
175,609	,,	Dec. 16	5	5	Do. 5 p.c. Deb. ...	120—125	...	...
19,284,128	,,	Aug. 12	5½	5½	Gas Light & Coke 4 p.c. Ord.	27/—28 -*a*	...	27/4½—27/9
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.... ...	89—92	...	90½—91
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	107—110	...	108½—110
8,602,497	,,	Dec. 2	3	3	Do. 3 p.c. Con. Deb. ...	90—93	+1	90—93
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	115—118	...	118½
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	113—116	...	114½
270,466	,,	Aug. 12	6	6	Harrogate New Cons. ...	132—137	...	...
140,000	1	Sept. 23	1 7½	1 7½	Hongkong & China, Ltd. ...	1'—1⅛	...	...
213,200	Stk.	Aug. 12	6	6	Hornsey Con. 3½ p.c. ...	130—135	...	134—135½
5,600,000	,,	Nov. 4	14	8	Imperial Continental Cap. ...	183—188	−2	183—188
223,130	,,	Jan. 20	3½	3½	Do. 3½ p.c. Red. Debs.	91—96*	−1	...
285,242	,,	Aug. 12	8½	8½	Lea Bridge 5 p.c. Ord. ...	175—180	...	...
165,736	,,	Aug. 26	10	8	Maidstone 5 p.c. Cap. ...	182—192	...	...
63,480	,,	Dec. 16	3	3	Do. 3 p.c. Deb. ...	79—84	...	84
75,000	,,	Dec. 2	†10	†10	Malta & Mediterranean ... Metropolitan (of Melbourne)	200—210	...	205
392,000	—	Oct. 1	5½	5½	5½ p.c. Red. Deb.	102—107	+4	104
231,978	Stk.	Aug. 12	5	5	M.S. Utility 'C' Cons. ...	108—113	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	102—107	+2	106—106⅞
360,075	,,	Dec. 16	4	4	Do. 4 p.c. Deb. ...	103—108	+2	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	120—125	...	...
125,000	—	Jan. 2	3½	3½	Do. 3½ p.c. Rd. Rg. Bds.	96—99	...	...
675,000	Stk.	Nov. 18	†3	†3	Montevideo, Ltd.	58—63	+10	60—62
225,000	,,	Aug. 12	7½	7½	North Middlesex 6 p.c. Con.	170—175	...	172
396,160	,,	Aug. 12	5	5	Northampton 5 p.c. max. ...	105—110	...	...
300,000	,,	Nov. 4	†7	†9	Oriental, Ltd....	163—168	...	...
416,617	,,	Dec. 16	8	8	Plymouth & Stonehouse 5 p.c.	162—167	+3	...
504,416	,,	Aug. 12	8½	8½	Portsm'th Con. Stk. 4 p.c. Std.	173—178	...	178—179
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	110—115	...	115—116
114,000	,,	July 22	5	5	Preston 5 p.c. Pref.	106—111	...	...
321,961	1	Sept. 23	...	1/-	Severn Va'. Gas Cor. Ld. Ord.	22 —23/-	...	22/6—22/7½
319,510	1	,,	...	-/10½	,, ,, 4½ p.c. Cum. Pref.	21/9—22/9	...	22/-
133,201	Stk.	Aug. 12	5	8½	Shrewsbury 5 p.c. Ord. ...	147—152	...	144½
90,000	10	May 27	†3	†3½	South African...	3—4	...	...
1,061,779	1	Sept. 23	1/2½	1/2½	South East'n Gas Cn. Ld. Ord.	27/6—28/6	...	28/3—28/6
845,016	1	,,	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref.	22/3—23/3	...	23/—23/3
450,000	Stk.	Aug. 12	4	4	Do. 4 p.c. Red. Deb. ...	100—103	...	—
6,709,895	,,	Aug. 12	6½	5	South Met. Ord.	132—137	...	133½—136
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf....	148—153	...	150½—151⅞
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf....	105—109	...	106†
1,895,445	,,	Dec. 16	3	3	Do. 3 p.c. Deb. ...	87—90	...	88½—90
1,000,000	,,	Jan. 6	5	5	Do. 5 p.c. Red. Deb.	113—116	...	...
1,543,795	,,	Aug. 12	6	6	South Suburban Ord. 5 p.c....	132—137	+2	136
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	121—126	...	...
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	103—108	...	...
888,587	,,	Dec. 16	5	5	Do. 5 p.c. Deb....	123—128	...	...
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	103—108	...	...
415,907	,,	Dec. 2	...	4	S. Western Gas & Water Ord.	22/6—24/6	...	23/-
160,523	,,	Oct. 21	...	...	Do. 4½% Red. Cum. Pref.	22/—23/-	...	22/1½
110,000	,,	Dec. 16	4	4	Do. 4½% Red. Deb. ...	98—103	...	...
647,740	,,	Aug. 12	5	5	Southampt'n Ord. 5 p.c. max.	115—120	...	...
121,275	,,	Dec. 16	4	4	Do. 4 p.c. Deb.	98—103	...	...
350,000	,,	Aug. 12	5½	5½	Swansea 5½ p.c. Red. Pref. ...	113—118	+1	114½—117¼
200,000	,,	Dec. 16	6½	6½	Do. 6½ p.c. Red. Deb. ...	96—101	...	...
94,000	,,	...	...	...	Do. 3½ p.c. Red. Deb. ...	96—101	...	...
1,076,490	,,	Aug. 12	6½	6½	Tottenham and District Ord.	150—155	+1	151—154½
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref....	130—135	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
334,615	,,	Dec. 2	4	4	Do. 4 p.c. Deb. ...	103—108	+3	105—107
369,774	,,	Aug. 12	7	7	Uxbridge, &c., 5 p.c. ...	152—157	...	...
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	117—122	...	...
1,340,521	,,	Aug. 12	7	7	Wandsworth Consolidated ...	159—164	...	161½—163
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	122—127	...	124½
1,317,964	,,	Dec. 16	5	5	Do. 5 p.c. Deb. ...	123—128	...	125⅛—127½
338,300	,,	,,	4	4	Do. 4 p.c. Deb. ...	102—107	...	...
499,735	,,	July 8	6½	6½	Watford and St. Albans Ord.	153—158	...	157
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
200,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	135—140	...	135—136½
200,000	,,	Dec. 2	4	4	Do. 4 p.c. Red. Deb.	98—103	...	...
100,000	,,	,,	...	3½	Do. 3½ p.c. Red. Deb.	96—101	...	...
158,400	,,	Aug. 12	6b	5	Winchester W. & G. 5 p.c. Con.	114—119	...	...

a.—The quotation is per £1 of Stock. *b*.—Paid £3, including 10s. on account of back dividends. * Ex div.
† Paid free of income-tax. ‡ For year. § Actual for three months.

Stock and Share List continued overleaf.

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R. N. LeFevre, M.Inst.Gas E.

Officer-in-Charge of Training, The Gas Light and Coke Company, Assistant Head of Department of Gas Engineering and Supply, Westminster Technical Institute.

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Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Jan. 24.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	July 22	6	5	Bath Cons.	123—125	...	...
1,667,250	,,	July 8	5	5	Bristol, 5 p.c. max. ...	119—121	...	...
120,420	,,	Dec. 16	4	4	Do. 1st 4 p.c. Deb. ...	102—104	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	102—104	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	125—128	...	...
274,000	,,	Aug. 12	5	5	Newport (Mon.) 5 p.c. max....	113—118	...	...
13,200	12	Aug. 26	8½	7	Pontyp'l Gas & W. 10 p.c. 'A.'	14½—15½	...	...
13,600	10	,,	6	5	Do. 7 p.c. 'B.'	11½—12½	...	...
40,000	10	,,	6	5	Do. 7 p.c. 'C.'	11½—12½	...	...
140,778	Stk.	Aug. 12	5	5	Weston-super-Mare Cons. ...	115—117	...	...
64,338	,,	Dec. 16	4	4	Do. 4 p.c. Deb.	98—100	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	165—169	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Aug. 12	6½	5	Chester 5 p.c. Ord.	109—114	...	...
92,500	,,	Dec. 16	4	4	Do. 4 p.c. Pref.	100—105	...	...
32,540	,,	,,	3½	3½	Do. 3½ p.c. Deb. ...	91—96	...	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	100—105	...	...
2,167,410	,,	Aug. 12	6	6	Liverpool 5 p.c. Ord. ...	134½—135½	...	...
245,500	,,	Dec. 16	5	5	Do. 5 p.c. Red. Pref. ...	103—108	...	...
306,083	,,	Jan. 6	4	4	Do. 4 p.c. Deb. ...	105—107	...	...
106,280	,,	July 22	10	10	Preston 'A' 10 p.c. ...	206—216	...	...
188,219	,,	,,	7	7	Do. 'B' 7 p.c.	142½—152½	...	...
NEWCASTLE EXCHANGE.								
122,577	Stk.	Aug. 12	8	8	Blyth 5 p.c. Ord.	151—153	...	...
732,000	,,	Aug. 12	5	5	Hartlepool G. & W. Co. & New	118—120	...	...
2,061,315	,,	Aug. 12	5½	5	Newcastle & Gateshead Con.	25/3—25/9a	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	107—108	...	...
776,706	,,	Dec. 16	3½	3½	Do. 3½ p.c. Deb. ...	100—102	...	...
277,285	,,	Oct. 21	5	5	Do. 5 p.c. Deb. '43...	105—106	...	...
209,820	,,	Aug. 12	8½	8½	South Shields Con.	173—175	...	...
299,542	,,	Aug. 12	6	6	Sunderland 6 p.c. max. ...	129—131	...	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Aug. 12	10	7	Derby Con.	175—185	...	...
55,000	,,	Dec. 16	4	4	Do. 4 p.c. Deb.	100—105	...	...
84,750	,,	Aug. 26	12	5	Long Eaton 'A' Ord. ...	150—160	...	...
50,000	,,	,,	10	4	Do. 'B' Ord. ...	130—140	...	...
20,000	10	June 7	5	5	Do. 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Aug. 26	10	10	Great Grimsby 'A' Ord. ...	220—230	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	220—230	...	...
79,000	,,	,,	10	10	Do. 'C' Ord. ...	205—215	...	...
1,736,968	,,	Aug. 26	6	6	Sheffield Cons.	143—145	+1½	...
95,000	,,	Dec. 16	4	4	Do. 4 p.c. Deb.	100½—102½	...	...

a The quotation is per £1 of Stock.

Supplementary List of Stocks and Shares not Officially Quoted

60,000	10	Sept. 9	10	10	Ascot 10 p.c. max.	22—24	...	...
58,680	10	,,	7	7	Do. 7 p.c. max.	14½—15½	...	...
90,000	1	Nov. 4	5	5	Assd. Gas and Water Ord. ...	21/—23/-	...	...
90,000	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	21/9—22/9	...	...
17,000	Stk	Aug. 26	8	8	Bognor Orig. Ord. 'A' ...	164—174	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	164—174	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	142—147	...	...
37,440	,,	July 22	10	10	Cam. Univ. & Town 10 p.c. max.	214—224	...	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	161—166	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	110—115	...	...
65,000	,,	Aug. 12	8½	7½	Eastbourne 'A' 5 p.c. ...	153—158	...	...
198,000	,,	,,	7	6	Do. 'B' 3½ p.c.	135—140	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	120—125	...	...
130,000	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	122—127	...	...
250,000	1	Nov. 18	...	4	Gas Consolidation Ord. ...	20/6—22/6	...	...
250,000	1	,,	...	4	Do. 4 p.c. Red. Cum. Pref.	19/6—20/6	...	19/9—19/10½
117,251	Stk.	Sept. 23	8 1/10	8 1/10	Gosport District Cons. ...	177—182	...	178½
73,350	,,	,,	5	5	Do. 5 p.c. Pref.	113—118	...	115½
24,000	30	Aug. 12	8½	8½	Great Yarmouth 8½ p.c. max.	53—58	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.... ...	43—46	...	...
51,160	Stk.	Dec. 2	5½	5½	Do. 5½ p.c. Deb.... ...	123—128	...	...
152,600	,,	Aug. 26	8	8	Guildford Cons.	175—180	+5	174—175½
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	116—121	...	...
68,250	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	120—125	...	...
156,600	,,	Aug. 12	7½	7½	Hampton Court Cons. ...	170—180	...	...
81,660	10	Feb. 4	5	9	Leatherhead Ord.	16—17	...	...
107,960	10	Sept. 23	5	4	Mid Kent Ord.	9½—10½	...	...
230,445	Stk.	Aug. 12	10	10	Oxford & District Ord. ...	215—225	...	220—223
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	117—122	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	115—120	...	...
126,193	,,	Nov. 18	7½	7½	Peterborough Ord.	160—170	...	...
64,990	,,	Sept. 9	7½	6½	Redditch Ord.	116—121	...	...
66,850	,,	Aug. 12	7	7	Romford Ord.	167—172	...	...
160,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Sept. 23	5	5	Do. 5 p.c. Deb.	121—126	...	...
10,950	,,	Aug. 26	8	8	Ryde Ord.	168—173	...	...
136,191	,,	July 22	7	5	Scarborough Ord.	130—140	...	...
277,825	,,	Aug. 26	8	8	Shanklin & Ventnor Cons. ...	155—165	...	...
40,643	,,	Sept. 23	7	7	Slough Ord.	150—155	...	...
221,000	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	116—121	...	...
28,872	1	Nov. 4	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	20/—22/-	...	...
28,866	1	Sept. 9	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	20/—22/-	...	...
24,930	Stk.	Aug. 12	7	7	Southgate & Dist. 7 p.c. max.	150—155	...	...
162,500	,,	,,	5	5	Do. 5 p.c. Pref.	117—122	...	...
17,228	,,	Aug. 12	6	5	Swindon Cons.	113—118	...	...
160,425	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	122—127	+2	125
50,000	1	...	...	...	Utd. Kingdom Gas Cpn. Ord.	1 3/4—1 7/8	...	20/10½—22/-
760,910	1	Nov. 18	...	2½	Do. 4½ p.c. Prefd. Ord....	19/6—20/6	...	...
110,910	1	,,	...	2½	Do. 4½ p.c. Cum. Pref. ...	20/6—21/6	...	20/9—21/-
900,000	Stk.	,,	...	...	Do. 3½ p.c. Red. Deb. ...	98—101	...	...
430,000	,,	Aug. 12	8	5	Wakefield Ord.	140—150	...	...
181,650	,,	...	5	5	Do. 5 p.c. max.	103—108	...	...
82,000	,,	July 22	6	6	Weymouth Ord.	108—113	...	...
70,000	,,	,,	6	4	York Cons.	107—112	...	109—109½
390,000	,,	Dec. 16	5	5	Do. 5 p.c. Red. Deb. ...	103—108	...	...
33,640	,,	Aug. 12	6½	6½	Yorktown (Cam.) 5 p.c. Cons.	120—125	...	...
100,000	,,	,,	5	5	Do. 5 p.c. Pref.	117—122	...	...
135,000	,,	Dec. 16	5½	5	Do. 5½ p.c. Deb.... ...	126—131	...	...

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